Recomended pass through the study plan

Name of the pass: Specialization Audiovisual Technology and Signal Processing - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering
Department:
Pass through the study plan: Electronics and Communications - Audiovisual Technology and Signal Processing
Branch of study guranteed by the department: Welcome page
Guarantor of the study branch:
Program of study: Electronics and Communications
Type of study: Follow-up master full-time
Note on the pass:

Coding of roles of courses and groups of courses:
P - compulsory courses of the program, PO - compulsory courses of the branch, Z - compulsory courses, S - compulsory elective courses, PV - compulsory elective courses, F - elective specialized courses, V - elective courses, T - physical training courses

Coding of ways of completion of courses (KZ/Z/ZK) and coding of semesters (Z/L):
KZ - graded assesment, Z - assesment, ZK - examination, L - summer semester, Z - winter semester

Number of semester: 1

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
BE2M99ZVT	**Audio Technology 1** *Libor Husník, Ondřej Jiříček, František Rund **František Rund** Libor Husník (Gar.)*	Z,ZK	6	2P+2L	Z	P
BE2M31DSPA	**Digital Signal Processing** *Petr Pollák **Petr Pollák** Petr Pollák (Gar.)*	Z,ZK	6	2P+2C	Z	P
BE2M37OBT	**Image Technology** *Lukáš Krauz, Petr Páta, Miloš Klíma, Karel Fliegel **Karel Fliegel** Petr Páta (Gar.)*	Z,ZK	6	2P+2L	Z	P
BE2M37MAM	**Microprocessors** *Stanislav Vítek **Stanislav Vítek** Stanislav Vítek (Gar.)*	Z,ZK	6	2P+2L	Z	P
BEEZM	**Safety in Electrical Engineering for a master´s degree** *Vladimír Kůla, Ivana Nová, Josef Černohous, Radek Havlíček **Radek Havlíček** Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z	P
BE2M31SYN	**Synthesis of Audio Signals** *Roman Čmejla **Roman Čmejla** Roman Čmejla (Gar.)*	Z,ZK	6	2P+2C	Z	P

Number of semester: 2

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors, **authors** and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
BE2M37KASA	**Compression of Images and Signals** *František Rund, Karel Fliegel, Stanislav Vítek, Václav Vencovský **Karel Fliegel** Stanislav Vítek (Gar.)*	Z,ZK	6	2P+2C	L	P
BE2M31ZRE	**Speech Processing** *Petr Pollák **Petr Pollák** Petr Pollák (Gar.)*	Z,ZK	6	2P+2C	L	P
BE2M32BTSA	**Wireless Technologies** *Zdeněk Bečvář, Lukáš Vojtěch, Zbyněk Kocur, Pavel Mach **Ján Kučerák** Zdeněk Bečvář (Gar.)*	Z,ZK	6	2P + 2L	Z,L	P
2018_MEKEPV2	**Compulsory subjects of the programme** *BE2M37MOTA,BE2M37ZV2A,..... (see the list of groups below)*	Min. cours. 5 Max. cours. 5	Min/Max 30/30			PV

Number of semester: 3

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
BE2MPROJ6	**Project** *František Rund, Zdeněk Bečvář, Jan Šístek, Pavel Máša, Ivan Pravda, Lubor Jirásek* ***František Rund*** *František Rund (Gar.)*	Z	6	0p+6s		P
2018_MEKEPV2	**Compulsory subjects of the programme** *BE2M37MOTA,BE2M37ZV2A,..... (see the list of groups below)*	Min. cours. 5 Max. cours. 5	Min/Max 30/30			PV
2018_MEKEVOL	**Elective subjects**	Min. cours. 0	Min/Max 0/999			V

Number of semester: 4

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
BDIP25	**Diploma Thesis**	Z	25	22s	L	P
2018_MEKEVOL	**Elective subjects**	Min. cours. 0	Min/Max 0/999			V

List of groups of courses of this pass with the complete content of members of individual groups

Kód	Name of the group of courses and codes of members of this group (for specification see here or below the list of courses)	Completion	Credits	Scope	Semester	Role
2018_MEKEPV2	**Compulsory subjects of the programme**	**Min. cours. 5** **Max. cours. 5**	**Min/Max** 30/30			**PV**
BE2M37MOTA	Advanced areas in image and vide ...	BE2M37ZV2A	Audio Technology 2	BEAM31BSG	Biological signals	
BE2M37DTRA	Digital Audio and Video Broadcas ...	BE2M37OBFA	Image Photonics	BE0M37FAV	Physiology and modeling of heari ...	
2018_MEKEVOL	**Elective subjects**	**Min. cours. 0**	**Min/Max** 0/999			**V**

List of courses of this pass:

Code	Name of the course	Completion	Credits
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.			
BE0M37FAV	Physiology and modeling of hearing and vision	Z,ZK	6
The primary aim of the course is to study the physiology of sensors and processes of perception of audio and visual information by human subjects as two central and most important communication channels, i.e., Human Auditory System (HAS) and Human Visual System (HVS). The course summarizes current knowledge in the field of human vision and hearing physiology and, at the same time, presents their description using mathematical models using the latest computational tools and procedures, including Machine Learning (ML), Deep Learning (DL) and Artificial Intelligence (AI). Emphasis is also placed on current and prospective applications of the mentioned knowledge. The main application area is the audiovisual technology related to human perception, but the direct employment of the acquired knowledge also includes the areas of multimedia technology, control systems, automation, robotics, safety and security technology, bioinspired systems, etc. At the same time, students gain a general overview of information processing in biological systems. A separate part is the objectification of audiovisual information perceived quality, i.e., Quality of Experience (QoE). The course is intended for students of master's degree in technical fields. The exercises will be devoted to fundamental experiments to determine the most important characteristics of HAS and HVS, including computational models and simulation of vision and hearing processes.			
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 http://noel.feld.cvut.cz/vyu/be2m31dspa .			

BE2M31SYN	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. Multimedia 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.			
BE2M31ZRE	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/be2m31zre. Pro zapsané studenty jsou detailní informace na výukovém portálu Moodle FEL.			
BE2M32BTSA	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.			
BE2M37DTRA	Digital Audio and Video 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 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.			
BE2M37KASA	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 compresion 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.			
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 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.			
BE2M37MOTA	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.			
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 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.			
BE2M37OBT	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.).			
BE2M37ZV2A	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.			
BE2M99ZVT	Audio Technology 1	Z,ZK	6
The course provides fundamentals of physical acoustics and acoustic measurement, including problems of noise from technical and perceptional point of view. In the second part principles of electroacoustic and electromechanical transducers are explained along with their analysis. Principles of audio compressing systems and spatial sound processing are also treated.			
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 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			
BEAM31BSG	Biological signals	Z,ZK	6
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.			
BEEZM	Safety in Electrical Engineering for a master´s degree	Z	0
The course provides for students of all programs periodic training guidelines for health and occupational safety and gives knowledge of electrical hazard of given branch of study. Students receive indispensable qualification according to the current Directive of the Dean.			

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