Study plan

Name of study plan: Medical electronics and bioinformatics

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: Medical Electronics and Bioinformatics Type of study: Follow-up master full-time Required credits: 114 Elective courses credits: 6 Sum of credits in the plan: 120 Note on the plan: Specializace Zpracování signál

Name of the block: Compulsory courses in the program Minimal number of credits of the block: 60 The role of the block: P

Code of the group: 2018_MBIODIP Name of the group: Diploma Thesis 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 1 course Credits in the group: 30 Note on the group:

| | 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 |
|--------|--|------------|---------|-------|----------|------|
| BDIP30 | Diploma Thesis | Z | 30 | 22s | L | Р |

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

 BDIP30
 Diploma Thesis
 Z
 30

 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_MBIOP

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:

| 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 |
|----------|--|------------|---------|-------|----------|------|
| BAM31BSG | Biological signals Roman mejla Roman mejla Roman mejla (Gar.) | Z,ZK | 6 | 2P+2L | L | Ρ |
| BMPROJ6 | Diploma Project Roman mejla, Jan Kybic, Vratislav Fabián, Petr Pošík Petr Pošík Roman mejla (Gar.) | Z | 6 | 0p+6s | Z,L | Ρ |
| BAM31LET | Medical Instrumentation and Devices Jan Havlík Jan Havlík Jan Havlík (Gar.) | Z,ZK | 6 | 2P+2L | Z | Р |
| B4M36SAN | Statistical Data Analysis Ji í Kléma Ji í Kléma Ji í Kléma (Gar.) | Z,ZK | 6 | 2P+2C | Z | Р |
| BAM33ZSL | Medical Imaging Systems Jan Kybic, Robert Holaj, André Sopczak, Jan Petr, André Sopczak Jan Kybic Jan Kybic (Gar.) | Z,ZK | 6 | 2P+2C | L | Ρ |

| Characteristics of | f the courses of this group of Study Plan: Code=2018_MBIOP Name=Compulsory subjects | of the progra | amme |
|--------------------|---|---------------|------|
| BAM31BSG | Biological signals | Z,ZK | 6 |
| BMPROJ6 | Diploma Project | Z | 6 |

| | Madical Instrumentation and Davison | | | | 7 71/ | |
|--------------------------------------|---|---------------------|----------------|---------------|-------------------|---------------------|
| BAM31LET Students will study fund | Medical Instrumentation and Devices lamental principles applied within the modern medical devices and systems, esp. from the pr | nint of view of fun | rtional block | | Z,ZK | 6 f diagnostica |
| | cal equipments including electrocardiographs, electroencephalographs, bedside and centra | | | | | |
| | for clinical laboratory, electrostimulators, cardiostimulators and defibrilators, blood pressur | | | | | |
| B4M36SAN | Statistical Data Analysis | | | 2 | Z,ZK | 6 |
| This course builds on th | e skills developed in introductory statistics courses. It is practically oriented and gives an intro | roduction to applie | ed statistics. | It mainly air | ns at multivari | ate statistica |
| | , i.e., the methods that help to understand, interpret, visualize and model potentially high-di | mensional data. It | can be see | n as a pure | ly statistical co | ounterpart to |
| machine learning and d | | | | | | |
| BAM33ZSL | Medical Imaging Systems | | - V | | Z,ZK | 6 |
| | principles, design and properties of currently used medical imaging devices. We shall deal w s Doppler ultrasound. We will also study tomographic (3D) imaging systems: computed tomo | | - | | | - |
| | r imaging methods (PET,SPECT). For more information see https://cw.fel.cvut.cz/wiki/course | | | ince inagin | g (imiti) includi | ing randdona |
| | | | | | | |
| Name of the b | lock: Povinné p edm ty specializace | | | | | |
| | er of credits of the block: 30 | | | | | |
| | | | | | | |
| The role of the | DIOCK. PS | | | | | |
| | | | | | | |
| Code of the gr | oup: 2018_MBIOPS4 | | | | | |
| Name of the a | roup: Compulsory subjects of specialization | | | | | |
| • | credits in the group: In this group you have to gain 30 | credite | | | | |
| • | | | | | | |
| | courses in the group: In this group you have to comple | ete 5 cours | ses | | | |
| Credits in the | group: 30 | | | | | |
| Note on the gr | oup: | | | | | |
| Ŭ | Name of the course / Name of the group of courses | | | | | |
| Code | (in case of groups of courses the list of codes of their | Completion | Cradite | Scone | Semester | Role |
| oode | members) | completion | orcans | ocope | Comester | |
| | Tutors, authors and guarantors (gar.) | | | | | |
| BAM31ADA | Adaptive signal processing Radoslav Bortel, Pavel Sovka Radoslav Bortel Radoslav Bortel (Gar.) | Z,ZK | 6 | 2P+2C | Z | PS |
| | Modeling and analysis of brain activity | 7 71/ | 6 | 20,20 | Z | |
| BAM31MOA | Jaroslav Hlinka Jaroslav Hlinka Jaroslav Hlinka (Gar.) | Z,ZK | 6 | 2P+2C | 2 | PS |
| BAM31NPG | Neurophysiology | Z,ZK | 6 | 2P+2C | Z | PS |
| | P emysl Jiruška, Helena Pivo ková P emysl Jiruška P emysl Jiruška (Gar.) | , | - | | | |
| B2M31DSP | Advanced DSP methods Pavel Sovka, Petr Pollák Pavel Sovka Pavel Sovka (Gar.) | Z,ZK | 6 | 2P+2C | Z,L | PS |
| DAM217AC | Analog Signal Processing | 7 71/ | 6 | 2P+2L | 1 | |
| BAM31ZAS | Ji í Hospodka Ji í Hospodka Ji í Hospodka (Gar.) | Z,ZK | 6 | ZP+2L | L | PS |
| | | - | | | | |
| | the courses of this group of Study Plan: Code=2018_MBIOPS4 Na | ame=Compu | lsory sub | - | <u> </u> | |
| BAM31ADA | Adaptive signal processing | | | 2 | Z,ZK | 6 |
| - | basic discourse on adaptive algorithms for filtering, decorrelation, separation and beamforr | ning. | | | 7 71/ | |
| BAM31MOA | Modeling and analysis of brain activity | | | | Z,ZK | 6 |
| BAM31NPG | Neurophysiology | | | | Z,ZK | 6 |
| B2M31DSP | Advanced DSP methods | | Craduate | | Z,ZK | 6 digital aignak |
| | basic course in signal processing and introduces advanced methods of analysis and digital s practically use them. They learn to know the conditions of use of correlation, spectral and of | | | | | |
| | mposition and independent component analysis and the time-frequency transformations. E | | | | | |
| analyses | | | | | | e e. orginal |

 BAM31ZAS
 Analog Signal Processing
 Z,ZK
 6

 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.

Name of the block: Compulsory elective courses Minimal number of credits of the block: 24 The role of the block: PV

Code of the group: 2018_MBIOPPV4 Name of the group: Compulsory subjects of the programme Requirement credits in the group: In this group you have to gain 24 credits Requirement courses in the group: In this group you have to complete 4 courses Credits in the group: 24 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 |
|---|--|--|--|---|--|---|
| B2M31AEDA | Experimental Data Analysis Jan Rusz Jan Rusz Jan Rusz (Gar.) | Z,ZK | 6 | 2P+2C | Z | PV |
| BAM17EPM | Applications of Electromagnetic Fields in Medicine Jan Vrba, Ladislav Oppl Jan Vrba Jan Vrba (Gar.) | Z,ZK | 6 | 2P+2L | L | PV |
| BAM31AOL | Applied optoelectronics in medicine Jan Havlík Jan Havlík Jan Havlík (Gar.) | Z,ZK | 6 | 2P+2L | L | PV |
| BAM36BIN | Bioinformatics Ji í Kléma Ji í Kléma Ji í Kléma (Gar.) | Z,ZK | 6 | 2P+2C | L | PV |
| BAM02BIO | Biosensors Bohuslav Rezek Bohuslav Rezek (Gar.) | Z,ZK | 6 | 2P+2L | Z | PV |
| BAM02FPT | Physics for Diagnostics and Therapy Vratislav Fabián, Jan Vrba, Ladislav Oppl Vratislav Fabián Vratislav Fabián (Gar.) | Z,ZK | 6 | 2P+2L | | PV |
| B0M37FAV | Physiology and modeling of hearing and vision Miloš Klíma, Václav Vencovský, Petr Maršálek, Karel Fliegel Karel Fliegel Václav Vencovský (Gar.) | Z,ZK | 6 | 2P+2C+4E | Z | PV |
| B4M35KO | Combinatorial Optimization Zden k Hanzálek Zden k Hanzálek Zden k Hanzálek (Gar.) | Z,ZK | 6 | 3P+2C | L | PV |
| BAM38KLS | Construction of Medical Systems Jan Holub Jan Holub Jan Holub (Gar.) | Z,ZK | 6 | 2P+2L | Z | PV |
| B4M33MPV | Computer Vision Methods Georgios Tolias, Ji í Matas, Jan ech, Dmytro Mishkin, Ond ej Drbohlav Ond ej Drbohlav Ji í Matas (Gar.) | Z,ZK | 6 | 2P+2C | L | PV |
| B4M36MBG | Molecular Biology and Genetics Martin Pospíšek Martin Pospíšek Martin Pospíšek (Gar.) | Z,ZK | 6 | 3P+1C | L | PV |
| BAM33NIN | Neuroinformatics Ji í Hammer, Daniel Novák, Eduard Bakštein, Karla Št pánová, Ján Antolík, David Kala, Pavel Filip Daniel Novák Daniel Novák (Gar.) | Z,ZK | 6 | 2P+2C | L | PV |
| B4M33PAL | Advanced algorithms Marko Genyk-Berezovskyj, Daniel Pr ša Daniel Pr ša (Gar.) | Z,ZK | 6 | 2P+2C | Z | PV |
| BE4M33SSU | Statistical Machine Learning Jan Drchal, Vojt ch Franc, Boris Flach Vojt ch Franc Boris Flach (Gar.) | Z,ZK | 6 | 2P+2C | Z | PV |
| B4M36SMU | Symbolic Machine Learning Filip Železný, Ond ej Kuželka, Gustav Šír Ond ej Kuželka Ond ej Kuželka (Gar.) | Z,ZK | 6 | 2P+2C | L | PV |
| BAM17EMC | Introduction to electromagnetic compatibility Tomáš Ko ínek Tomáš Ko ínek Tomáš Ko ínek (Gar.) | Z,ZK | 6 | 2P+2L | Z | PV |
| BAM33ZMO | Medical Image Processing Jan Kybic Jan Kybic (Gar.) | Z,ZK | 6 | 2P+2C | Z | PV |
| B2M31AEDA In the course of subject interpretation of data. In project, student will solve | the courses of this group of Study Plan: Code=2018_MBIOPPV4 I Experimental Data Analysis "Experimental Data Analysis", students will acquire knowledge regarding fundamental me the course of practical lectures, students will solve individual tasks using real data from sig e complex task and present obtained results. The aim of the subject is to introduce practical ninking and to acquire additional knowledge in solution of practical tasks. | hods for data ana | alysis and m neuroscien | achine lear ce research | Z,ZK ning for evalua . In the course | 6 ition and of semestra |
| BAM17EPM The major aim of these le in medicine. Safety limits | Applications of Electromagnetic Fields in Medicine ectures is to give to students a basic overview of biophysical aspects of EM fields in different s, clinical usage of EM field effects on biological systems, microwave hyperthermia, measu | | - | an overviev | | |
| | nagnetic resonance imaging, interaction of optical radiation with biological tissue. Applied optoelectronics in medicine | | | Z | Z,ZK | 6 |
| BAM36BIN | Bioinformatics | | | | Z,ZK | 6 |
| BAM02BIO BAM02FPT | Biosensors Physics for Diagnostics and Therapy | | | | z,zk z,zk | 6 6 |
| methods, therapeutic ult magnetic stimulation of t attention is paid to the p BOM37FAV The primary aim of the c communication channels | vill be introduced to the problems of locomotive organs diseases and musculoskeletal pain ir rasound and phototherapy. Furthermore, advanced neurorehabilitation methods, especially the brain - rTMS, transcranial electrical stimulation of the brain - tDCS and electroconvulsiv ossibilities of using ionizing electromagnetic fields in medical diagnostics and therapy (eg Physiology and modeling of hearing and vision course is to study the physiology of sensors and processes of perception of audio and visu s, i.e., Human Auditory System (HAS) and Human Visual System (HVS). The course sumr ame time, presents their description using mathematical models using the latest computati | y transcranial brai /e therapy - ECT) X-ray, proton thera al information by I narizes current kn | n stimulatio are discuss apy, radiothe human subj owledge in | n methods (ed. In the se erapy, etc.). Zects as two the field of t | (repetitive trans econd half of t Z,ZK central and mo numan vision a | scranial he semester 6 ost importan and hearing |
| Learning (DL) and Artific technology related to hu safety and security techn objectification of audiovi | cial Intelligence (AI). Emphasis is also placed on current and prospective applications of the man perception, but the direct employment of the acquired knowledge also includes the arc nology, bioinspired systems, etc. At the same time, students gain a general overview of information perceived quality, i.e., Quality of Experience (QoE). The course is intende mental experiments to determine the most important characteristics of HAS and HVS, inclu- | mentioned know eas of multimedia prmation processi d for students of r | ledge. The r technology, ng in biolog naster's deg | nain applica control sys ical systems gree in techr | tion area is the tems, automat s. A separate p nical fields. The | e audiovisua ion, robotics part is the e exercises |

| B4M35KO | Combinatorial Optimization | Z.ZK | 6 |
|----------------------------|--|------------------------|------------------|
| | problems and algorithms of combinatorial optimization (often called discrete optimization; there is a strong overlap with the ter | , , | - |
| - | gebra, graph theory, and basics of optimization, we show optimization techniques based on graphs, integer linear programmi | - | |
| | ace search methods. We focus on application of optimization in stores, ground transportation, flight transportation, logistics, p | | |
| scheduling in production | lines, message routing, scheduling in parallel computers. | Ū | |
| BAM38KLS | Construction of Medical Systems | Z,ZK | 6 |
| B4M33MPV | Computer Vision Methods | Z,ZK | 6 |
| The course covers select | cted computer vision problems: search for correspondences between images via interest point detection, description and ma | ching, image stite | hing, detection, |
| recognition and segmer | tation of objects in images and videos, image retrieval from large databases and tracking of objects in video sequences. This | course is also pa | art of the |
| inter-university program | me prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader insight into the fiel | d of artificial intell | igence. More |
| information is available | at https://prg.ai/minor. | | |
| B4M36MBG | Molecular Biology and Genetics | Z,ZK | 6 |
| BAM33NIN | Neuroinformatics | Z,ZK | 6 |
| The Neuroinformatics C | ourse concentrates on modelling of neurons, stochastic learning on cellular level, information coding and decoding in brain and | single unit proce | ssing. Examples |
| from clinical practices a | re provided throughout the course. The labs focus on signal neuron analysis from human and animal brain. | | |
| B4M33PAL | Advanced algorithms | Z,ZK | 6 |
| Basic graph algorithms | and graph representation. Combinatorial algorithms. Application of formal languages theory in computer science - pattern ma | tching. | |
| BE4M33SSU | Statistical Machine Learning | Z,ZK | 6 |
| The aim of statistical ma | achine learning is to develop systems (models and algorithms) for learning to solve tasks given a set of examples and some | orior knowledge a | bout the task. |
| This includes typical tas | ks in speech and image recognition. The course has the following two main objectives 1. to present fundamental learning cor | ncepts such as ris | k minimisation, |
| maximum likelihood esti | mation and Bayesian learning including their theoretical aspects, 2. to consider important state-of-the-art models for classific | ation and regress | ion and to show |
| how they can be learned | d by those concepts. | | |
| B4M36SMU | Symbolic Machine Learning | Z,ZK | 6 |
| This course consists of | four parts. The first part of the course will explain methods through which an intelligent agent can learn by interacting with its | environment, also | known as |
| reinforcement learning. | This will include deep reinforcement learning. The second part focuses on Bayesian networks, specifically methods for inferen | nce. The third part | will cover |
| fundamental topics from | natural language learning, starting from the basics and ending with state-of-the-art architectures such as transformer. Finally | y, the last part will | provide an |
| introduction to several to | ppics from the computational learning theory, including the online and batch learning settings. | | |
| BAM17EMC | Introduction to electromagnetic compatibility | Z,ZK | 6 |
| The subject dwells on p | roblems of electromagnetic compatibility. Students obtain the basic knowledges in the field of electromagnetic compatibility - | electromagnetic i | nterference, |
| susceptibility and testing | g methods. The subject leads to gain professional skills in the field of electrical engineering. | | |
| BAM33ZMO | Medical Image Processing | Z,ZK | 6 |
| This course covers the | nost used advanced image analysis methods, with emphasis on images from medical and biological modalities, from microso | copy, to ultrasoun | d, MRI, or CT, |
| including time sequence | 9S. | | |
| | | | |

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_MBIOH 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 Marcela Efmertová (Gar.) | Z,ZK | 5 | 2P+2S | Z,L | V |
| B0M16HSD1 | History of economy and social studies Marcela Efmertová | Z,ZK | 5 | 2P+2S | Z,L | V |
| B0M16PSM | Psychology Jan Fiala Jan Fiala Jan Fiala (Gar.) | Z,ZK | 5 | 2P+2S | Z,L | V |
| A003TV | Physical Education | Z | 2 | 0+2 | L,Z | V |
| B0M16TEO | Theology Vladimír Sláme ka Vladimír Sláme ka Vladimír Sláme ka (Gar.) | Z,ZK | 5 | 2P+2S | Z,L | V |

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

| B0M16FIL | | Z,ZK | 5 |
|----------------------------|--|---------------------|-------------------|
| B0M16HVT | History of science and technology 2 | Z,ZK | 5 |
| This subject traces histe | orical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate s | tudents' interest i | 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 | | | |
| 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 air | ns and achieved r | esults as well as |
| the social and cultural of | levelopment 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 lectur | re the basic theolo | ogic disciplines |
| are gone through. The s | 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 k | now Christianity |

- religion from which graws our civilization up.

Code of the group: 2018_MBIOVOL 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: ~Nabídk

~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:

| A003TV Physical Education Z 2 BOM16FIL Z,ZK 5 BOM16HSD1 History of economy and social studies Z,ZK 5 This subject deals with the history of the Czach society in the 19th - 21th centrules. It follows the forming of the Czach policial representation, its aims and achieved results as well as the social and cultural development and coexistence of the various ethnical groups in the Czach countries. 5 BOM16HVT History of science and technology 2 Z,ZK 5 This subject traces historical developments in technical education and professional organizations, the process of shaping scientific lite and the influence of technical engineers 2 Z,ZK 5 BOM16PSM Psychology Z,ZK 5 BOM16TEO Theology Z,ZK 5 BOM16TEO Theology Z,ZK 5 BOM37FAV Physiology and modeling of hearing and vision Z,ZK 6 BOM37FAV Physiology and modeling of hearing and vision Z,ZK 6 The prinary aim of the course is ot study the physiology and modeling of hearing and vision Z,ZK 6 The prinary aim of the course is to study the physiology and modeling of hearaning and vision < |
|--|
| B0M16HSD1 History of economy and social studies Z,ZK 5 This subject deals with the history of the Czech society in the 19th - 21th centruines. It follows the forming of the Czech political representation, its ams and achieved results as well as the social and cultural development and cecketines of the various ethnical groups in the Czech contribution. Z,ZK 5 B0M16HVT History of science and technology 2 Z,ZK 5 B0M16PSM Psychology Z,ZK 5 B0M16PSM Psychology and rodeling and requires no special previous education. After short philosciphic 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 Christianly - religion from which graws our civilization up. 2,ZK 6 B0M376AV Physiology and modeling of hearing and and proceuses, including Machine Learning (ML). Deep Learning (DL) and the activitis MSM and Human Visual System (HX). The course summarizes current |
| This subject deals with the history of the Czech society in the 19th - 2 ^{fth} centuries. If follows the forming of the Czech countries. BOM16HVT 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, the Unitate students' interest in the history and indices of the various ethnical groups in the Czech countries. Science and technology 2 Z,ZK 5 BOM16HVT History of science and technology 2 Z,ZK 5 BOM16PSM Psychology Z,ZK 5 BOM16FCO Theology Z,ZK 5 BOM16FVT Psychology Z,ZK 5 BOM16FO Theology Z,ZK 5 This subject provides to students the basic orientation in christian theology and requires no special previous education. After short philoscphic lecture the basic theologic disciplines are gene 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 Christiant to mortunication channels, i.e., Human Auditory System (AKS) and Human Visual System (HVS). The course summarizes current knowledge in the field of human vision and hearing privalogy and. It hearing and vision and proceedings. Including Machine Learning (ML). Deep tearming (DL) and Artificial Intelligence (A). Emphasis is also placed on current and prospecifive applications of the mentioned knowledge. The main application area is the adu |
| the social and cultural development and coexistence of the various ethnical groups in the Czech countries. BOM16HVT Listory of science and technology 2 Z,ZK 5 BOM16PSM Z,ZK 5 BOM16PSM Z,ZK 5 BOM16PSM Z,ZK 5 BOM16PSM Z,ZK 5 BOM16TEO Teclogy Z,ZK 5 BOM37FAV Psychology Z,ZK 6 BOM37FAV Physiology and modeling of hearing and vision Z,ZK 6 BOM37FAV Physiology and modeling of hearing and vision Z,ZK 6 BOM37FAV Physiology of sensors and processes of perception of sudia and visioal information by human subjects as two central and most important religion from which graves our civilization up. -religion from sum of the course is to study the physiology of sensors and processes of perception ot sudia wisial information by human subjects as two central and most importants improtestima and toxicis and most important physi |
| BOM16HVT 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 Landa. Its ultimate goal is to stimulate students' interest in the history and traditions of the subject while highlighting the developments in technical engineers 5 BOM16PSM Psychology Z,ZK 5 BOM16FEO 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. BOM37FAV 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 Audiroy System (HAS) and Human Visual System (HYS). The course summarizes current knowledge in the field of human visual and most important communication channels, i.e., Human Audiroy System (HAS) and Human Visual System (HAS). The course is intended for students of master's degree in technical field. The exercises will be devided to fundam perception, but the direct employment of the acquired knowledge also includes the areas of multimedia technology, coincing yestems, automation processing in biological systems, automation, robotics, safety and security technology, bioinspired systems, etc. At the same time, students gain a general overviwe of information processing in |
| This subject traces historical developments in electrical engineering branches in the vortal and net Carbol. Lads. Its ultimate goal is to stimulate students' interest in the history and engineers BOM16PSM Psychology Z,ZK 5 BOM16TEO Theology Z,ZK 5 This subject provides to students the basic orientation in christian theology and requires on 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 ense who want to get know Christianity - religoin from which graws our civilization up. Image: Communication channels, is, Human Auditory System (HAS) and Human Nusual System (HAS). 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 proceedures, including Machine Learning (ML). Deep Learning (DL) and Artificial Integence (A). Entry and Human Shuse applications of the eminoted knowledge. The main application are in the auditoxisual information processing in biological systems. A separate part is the objectification or aduoisval al information processing in biological systems, A separate part is the objectification of audito and HVS, including computational models and simulation of vision and hearing processes. BOM31FEV Experimental Data Analysis', students will a general overview of information processing in biological systems, A separate part is the objectification or aduoisval al information processing. In blogical systems, A separate part is the objeclification or aduoisval al information processing in |
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| |
| information is available at https://prg.ai/minor. |
| B4M33PAL Advanced algorithms Z,ZK 6 |
| Basic graph algorithms and graph representation. Combinatorial algorithms. Application of formal languages theory in computer science - pattern matching. |
| B4M35KO Combinatorial Optimization Z,ZK 6 |
| The goal is to show the problems and algorithms of combinatorial optimization (often called discrete optimization; there is a strong overlap with the term operations research). Following |
| the courses on linear algebra, graph theory, and basics of optimization, we show optimization techniques based on graphs, integer linear programming, heuristics, approximation |
| |
| algorithms and state space search methods. We focus on application of optimization in stores, ground transportation, flight transportation, logistics, planning of human resources, |

| B4M36MBG | Molecular Biology and Genetics | Z,ZK | 6 |
|--|---|---|--|
| B4M36SAN | Statistical Data Analysis | Z,ZK | 6 |
| | n the skills developed in introductory statistics courses. It is practically oriented and gives an introduction to applied statistics. It mainly | • | - |
| | ling, i.e., the methods that help to understand, interpret, visualize and model potentially high-dimensional data. It can be seen as a pumachine learning and data mining courses. | | |
| B4M36SMU | Symbolic Machine Learning | Z,ZK | 6 |
| | ists of four parts. The first part of the course will explain methods through which an intelligent agent can learn by interacting with its e | • | known as |
| reinforcement lea | arning. This will include deep reinforcement learning. The second part focuses on Bayesian networks, specifically methods for inference | ce. The third par | t will cover |
| fundamental topic | s from natural language learning, starting from the basics and ending with state-of-the-art architectures such as transformer. Finally, introduction to several topics from the computational learning theory, including the online and batch learning settings. | the last part will | provide an |
| BAM02BIO | Biosensors | Z,ZK | 6 |
| BAM02FPT | Physics for Diagnostics and Therapy | Z,ZK | 6 |
| | nts will be introduced to the problems of locomotive organs diseases and musculoskeletal pain in the first seven lectures. Great space is | • | rotherapeutic |
| magnetic stimulatio | utic ultrasound and phototherapy. Furthermore, advanced neurorehabilitation methods, especially transcranial brain stimulation meth n of the brain - rTMS, transcranial electrical stimulation of the brain - tDCS and electroconvulsive therapy - ECT) are discussed. In the on is paid to the possibilities of using ionizing electromagnetic fields in medical diagnostics and therapy (eg X-ray, proton therapy, rad | e second half of t | |
| BAM17EMC | Introduction to electromagnetic compatibility | Z.ZK | 6 |
| I | s on problems of electromagnetic compatibility. Students obtain the basic knowledges in the field of electromagnetic compatibility - ele | , | |
| ine casjeet anen | susceptibility and testing methods. The subject leads to gain professional skills in the field of electrical engineering. | bett ernagt etter in | |
| BAM17EPM | Applications of Electromagnetic Fields in Medicine | Z,ZK | 6 |
| | ese lectures is to give to students a basic overview of biophysical aspects of EM fields in different biological systems, including an overview | | - |
| - | limits, clinical usage of EM field effects on biological systems, microwave hyperthermia, measurement of dielectric parameters of bio | | |
| | of mobile phone users, magnetic resonance imaging, interaction of optical radiation with biological tissue. | | in expectic |
| BAM31ADA | Adaptive signal processing | Z,ZK | 6 |
| | This course provides a basic discourse on adaptive algorithms for filtering, decorrelation, separation and beamforming. | ۲,۷۲ | 0 |
| BAM31AOL | Applied optoelectronics in medicine | Z,ZK | 6 |
| | | Z,ZK | _ |
| BAM31BSG BAM31LET | Biological signals Medical Instrumentation and Devices | Z,ZK Z,ZK | 6 |
| and therapeutica | undamental principles applied within the modern medical devices and systems, esp. from the point of view of functional blocks and e I medical equipments including electrocardiographs, electroencephalographs, bedside and central monitors, equipments for anestesic nents for clinical laboratory, electrostimulators, cardiostimulators and defibrilators, blood pressure and flow measurement (including d | ology, intensive a | and critical |
| BAM31MOA | Modeling and analysis of brain activity | Z,ZK | 6 |
| BAM31NPG | Neurophysiology | Z,ZK | 6 |
| BAM31ZAS | Analog Signal Processing | Z,ZK | |
| | th analog input-output blocks for signal transmission and processing. They discussed circuit solution of amplifiers and filters, including th | | h |
| The course acute m | | • | 6 |
| | | eir design proces | ss, simulation |
| and measuremen | t. Students learn the circuit concepts and possibilities for solving the contemporary analogue structures. The second part of the cours | eir design proces e describes the | ss, simulatior design and |
| and measuremen implementa | t. Students learn the circuit concepts and possibilities for solving the contemporary analogue structures. The second part of the cours tion of analog filters, including discrete-time circuits. The conclusion is devoted to the possibilities of computer optimization of electron | eir design proces e describes the nic circuits and fi | ss, simulatior design and lters. |
| and measuremen implementa BAM33NIN | t. Students learn the circuit concepts and possibilities for solving the contemporary analogue structures. The second part of the cours | eir design processe describes the nic circuits and find Z,ZK gle unit processing | design and liters. |
| and measuremen implementa BAM33NIN | t. Students learn the circuit concepts and possibilities for solving the contemporary analogue structures. The second part of the cours tion of analog filters, including discrete-time circuits. The conclusion is devoted to the possibilities of computer optimization of electron Neuroinformatics course concentrates on modelling of neurons, stochastic learning on cellular level, information coding and decoding in brain and sing | eir design processe describes the nic circuits and find Z,ZK gle unit processing | design and liters. |
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For updated information see <u>http://bilakniha.cvut.cz/en/f3.html</u> Generated: day 2024-05-19, time 10:49.