Recomended pass through the study plan

Name of the pass: Specialization Medical Instrumentation - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering

Department:

Pass through the study plan: Medical Electronics and Bioinformatics - Specialization Medical Instrumentation

Branch of study guranteed by the department: Welcome page

Guarantor of the study branch:

Program of study: Medical Electronics and Bioinformatics

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 |
|----------------|---|--------------------------------------|------------------|---------|----------|------|
| BEAM31LET | Medical Instrumentation and Devices Jan Havlík Jan Havlík (Gar.) | Z,ZK | 6 | 2P+2L | Z | Р |
| BEEZM | Safety in Electrical Engineering for a master's degree Vladimír K la, Ivana Nová, Josef ernohous, Radek Havlí ek Radek Havlí ek Vladimír K la (Gar.) | Z | 0 | 2BP+2BC | Z | Р |
| BE4M36SAN | Statistical data analysis Ji í Kléma Ji í Kléma Ji í Kléma (Gar.) | Z,ZK | 6 | 2P+2C | Z | Р |
| BEAM31NPG | Neurophysiology P emysl Jiruška, Helena Pivo ková P emysl Jiruška P emysl Jiruška (Gar.) | Z,ZK | 6 | 2P+2C | Z | PS |
| BEAM02FPT | Physics for Diagnostics and Therapy Jan Vrba, Ladislav Oppl, Vratislav Fabián, Jaroslav Jíra Vratislav Fabián Vratislav Fabián (Gar.) | Z,ZK | 6 | 2P+2L | | PS |
| 2018_MBIOEPPV2 | Compulsory elective subjects of the programme BEAM31ADA,BE4M33PAL, (see the list of groups below) | Min. cours. 4 Max. cours. 4 | Min/Max 24/24 | | | PV |

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 |
|----------------|---|--------------------------------------|------------------|-------|----------|------|
| BEAM31BSG | Biological signals Petr Ježdík, Roman mejla, Michal Novotný Roman mejla Roman mejla (Gar.) | Z,ZK | 6 | 2P+2L | L | Р |
| BEAM33ZSL | Medical Imaging Systems Jan Kybic, Vít Herynek, André Sopczak Jan Kybic Jan Kybic (Gar.) | Z,ZK | 6 | 2P+2C | L | Р |
| BEAM31ZAS | Analog Signal Processing Ji í Hospodka Ji í Hospodka (Gar.) | Z,ZK | 6 | 2P+2C | L | PS |
| BEAM17EPM | Applications of Electromagnetic Fields in Medicine Jan Vrba Jan Vrba (Gar.) | Z,ZK | 6 | 2P+2L | L | PS |
| 2018_MBIOEPPV2 | Compulsory elective subjects of the programme BEAM31ADA,BE4M33PAL, (see the list of groups below) | Min. cours. 4 Max. cours. 4 | Min/Max 24/24 | | | 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 |
|----------------|---|--------------------------------------|------------------|-------|----------|------|
| BEMPROJ6 | Diploma Project Vratislav Fabián, Jan Kybic, Roman mejla, Petr Pošík Petr Pošík Roman mejla (Gar.) | Z | 6 | 0p+6s | Z,L | Р |
| BEAM38KLS | Construction of Medical Systems Jan Holub Jan Holub (Gar.) | Z,ZK | 6 | 2P+2L | Z | PS |
| 2018_MBIOEPPV2 | Compulsory elective subjects of the programme BEAM31ADA,BE4M33PAL, (see the list of groups below) | Min. cours. 4 Max. cours. 4 | Min/Max 24/24 | | | PV |
| 2018_MBIOEVOL | Elective subjects | Min. cours. | Min/Max 0/999 | | | V |

Number of semester: 4

| | 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 |

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

| Kód | | Name of the group of group (for specificat | of courses and ion see here o | codes of members of this r below the list of courses) | Com | pletion | Credits | Scope | Semester | Role |
|-----------|------------|--|----------------------------------|---|--|----------------------------|---------|----------------------------------|------------|------|
| 2018_MBIC | DEPPV2 | Compulsory e | lective subject | s of the programme | | cours. 4 cours. 4 | Min/Ma | × | | PV |
| BEAM31ADA | Adaptive s | ignal processing | BE4M33PAL | Advanced Algorithms | | BEAM31 | AOL A | Applied optoelectronics in medic | | |
| BEAM36BIN | Bioinforma | itics | BEAM02BIO | Biosensors | | BE4M35 | ко с | Combinatorial Optimization | | |
| BE4M33MPV | Computer | Vision Methods | BE2M31DSPA | Digital Signal Processing | | BEAM17 | EMC Ir | Introduction to Electromagnetic | | tic |
| BEAM33ZMO | Medical Im | nage Processing | BEAM31MOA | Modeling and analysis of brain a | | BEAM33 | MOS N | lodeling and | Simulation | |
| BE4M36MBG | Molecular | Biology and Genetics | BEAM33NIN | Neuroinformatics | BE4M33SSU Statistical Machine Learning | | | | | |
| BE4M36SMU | Symbolic N | Machine Learning | | • | | • | | | | |
| 2018_MBI | OEVOL | | Elective subj | ects | Min. | cours. | Min/Ma | ĸ | | V |

0/999

List of courses of this pass:

| Code | Name of the course | Completion | Credits |
|---------------------|---|-------------------------------|--------------|
| 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 h | ner branch of study | , which will |
| be specified b | by branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the compreh | ensive final examir | nation. |
| 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 process | sing): disrete-time | signals and |
| systems, signal o | haracteristics in time and frequency domain, Fourier transform, fast algorithms for DFT computation, introduction to digital filter desig | ın, digital filtering in | n time and |
| | frequency domain, decimation and interpolation and their usage in filter banks, basics of LPC analysis. Further details can be foun | d at <a< td=""><td></td></a<> | |
| | href=http://noel.feld.cvut.cz/vyu/be2m31dspa>http://noel.feld.cvut.cz/vyu/be2m31dspa . | | |
| BE4M33MPV | Computer Vision Methods | Z,ZK | 6 |
| The course covers | selected computer vision problems: search for correspondences between images via interest point detection, description and matchi | ng, image stitching | g, detection |
| recognition and | segmentation of objects in images and videos, image retrieval from large databases and tracking of objects in video sequences. Thi | s course is also pa | rt of the |
| inter-university pr | pgramme protai Minor. It pools the best of Al education in Prague to provide students with a deeper and broader insight into the field | of artificial intellige | ence. More |

information is available at https://prg.ai/minor.

| BE4M33PAL | Advanced Algorithms 2 | Z,ZK | 6 |
|--|--|--|--|
| Basic graph | algorithms and graph representation. Combinatorial algorithms. Application of formal languages theory in computer science - pattern | matching. | |
| 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 prior known | wledge abo | ut the task |
| his includes typical task | is in speech and image recognition. The course has the following two main objectives 1. to present fundamental learning concepts such | ch as risk m | inimisatio |
| aximum likelihood estim | nation and Bayesian learning including their theoretical aspects, 2. to consider important state-of-the-art models for classification and | regression | and to sh |
| | how they can be learned by those concepts. | | |
| BE4M35KO | · | Z,ZK | 6 |
| - | roblems and algorithms of combinatorial optimization (often called discrete optimization; there is a strong overlap with the term operation | | - |
| | lgebra, graph theory, and basics of optimization, we show optimization techniques based on graphs, integer linear programming, heur | | |
| algorithms and state sp | pace search methods. We focus on application of optimization in stores, ground transportation, flight transportation, logistics, planning | or numan r | esources |
| E 4MOCMBO | scheduling in production lines, message routing, scheduling in parallel computers. | 7 71/ | |
| BE4M36MBG | 0, | Z,ZK | 6 |
| BE4M36SAN | | Z,ZK | 6 |
| | skills developed in introductory statistics courses. It is practically oriented and gives an introduction to applied statistics. It mainly aims a .e., the methods that help to understand, interpret, visualize and model potentially high-dimensional data. It can be seen as a purely s | | |
| ialysis and modelling, i. | machine learning and data mining courses. | statistical co | unterpar |
| BE4M36SMU | - | Z,ZK | 6 |
| | f four parts. The first part of the course will explain methods through which an intelligent agent can learn by interacting with its environ | | _ |
| | . This will include deep reinforcement learning. The second part focuses on Bayesian networks, specifically methods for inference. The | | |
| = | m natural language learning, starting from the basics and ending with state-of-the-art architectures such as transformer. Finally, the las | | |
| • | introduction to several topics from the computational learning theory, including the online and batch learning settings. | | |
| BEAM02BIO | Biosensors | Z,ZK | 6 |
| l l | e physical, electronic, biological principles of biosensors and provides information on past, present and future technologies. Various m | nechanisms | and sen |
| ncepts for specific appli | ications (such as detection of glucose, urea, proteins, cells, bacteria, etc.) are explained. In addition, the course introduces the use of | modern nar | nostructu |
| and nanomaterials in bid | osensors to achieve reliable and sensitive devices for diagnosis at the point of care, in food safety or environmental monitoring. We wi | ill also discu | iss curre |
| | challenges and future perspectives for various applications of biosensors. | | |
| BEAM02FPT | Physics for Diagnostics and Therapy | Z,ZK | 6 |
| | ill be introduced to the problems of locomotive organs diseases and musculoskeletal pain in the first seven lectures. Great space is devot | | • |
| • | ultrasound and phototherapy. Furthermore, advanced neurorehabilitation methods, especially transcranial brain stimulation methods (r | | |
| | ne brain - rTMS, transcranial electrical stimulation of the brain - tDCS and electroconvulsive therapy - ECT) are discussed. In the second | | e semes |
| | paid to the possibilities of using ionizing electromagnetic fields in medical diagnostics and therapy (eg X-ray, proton therapy, radiother | | |
| BEAM17EMC | | Z,ZK | 6 |
| | problems of electromagnetic compatibility. Students obtain the basic knowledges in the field of electromagnetic compatibility - electrom | | erterence |
| The course dwells on p | | nagnetic inte | 3110101100 |
| | susceptibility and testing methods. The course leads to gain professional skills in the field of electrical engineering. | | |
| BEAM17EPM | susceptibility and testing methods. The course leads to gain professional skills in the field of electrical engineering. Applications of Electromagnetic Fields in Medicine | Z,ZK | 6 |
| BEAM17EPM he major aim of these led | susceptibility and testing methods. The course leads to gain professional skills in the field of electrical engineering. Applications of Electromagnetic Fields in Medicine ctures is to give to students a basic overview of biophysical aspects of EM fields in different biological systems, including an overview of | Z,ZK microwave | 6 application |
| BEAM17EPM he major aim of these led | susceptibility and testing methods. The course leads to gain professional skills in the field of electrical engineering. Applications of Electromagnetic Fields in Medicine ctures is to give to students a basic overview of biophysical aspects of EM fields in different biological systems, including an overview of clinical usage of EM field effects on biological systems, microwave hyperthermia, measurement of dielectric parameters of biological | Z,ZK microwave | 6 application |
| BEAM17EPM he major aim of these led | susceptibility and testing methods. The course leads to gain professional skills in the field of electrical engineering. Applications of Electromagnetic Fields in Medicine ctures is to give to students a basic overview of biophysical aspects of EM fields in different biological systems, including an overview of chinical usage of EM field effects on biological systems, microwave hyperthermia, measurement of dielectric parameters of biological of mobile phone users, magnetic resonance imaging, interaction of optical radiation with biological tissue. | Z,ZK microwave al tissues, El | 6 application |
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| BEAM33ZMO | Medical Image Processing | Z,ZK | 6 | | | | | | |
|---|--|---------------------|---------------|--|--|--|--|--|--|
| This subject describ | This subject describes algorithms for digital image processing of 2D and 3D images, with emphasis on biomedical applications. We shall therefore concentrate on the most often used | | | | | | | | |
| techniques in medical image processing: segmentation, registration, and classification. The methods will be illustrated by a range of examples on medical data. The students will | | | | | | | | | |
| implement some of | the algorithms during the practice sessions. Because of the very large overlap between courses A6M33ZMO and A4M33ZMO, the control of the cont | ourses will be tau | ght together | | | | | | |
| | this year. | | | | | | | | |
| BEAM33ZSL | Medical Imaging Systems | Z,ZK | 6 | | | | | | |
| The course covers t | he principles, design and properties of currently used medical imaging devices. We shall deal with 2D microscopic, X-ray and ultrasou | nd imaging system | ns, including | | | | | | |
| advanced topics su | ch as Doppler ultrasound. We will also study tomographic (3D) imaging systems: computed tomography (CT), magnetic resonance ima | ging (MRI) includin | g functional | | | | | | |
| | MRI (fMRI) and nuclear imaging methods (PET,SPECT). For more information see https://cw.fel.cvut.cz/wiki/courses/zsl | | | | | | | | |
| BEAM36BIN | Bioinformatics | Z,ZK | 6 | | | | | | |
| BEAM38KLS | Construction of Medical Systems | Z,ZK | 6 | | | | | | |
| General principles | and design and construction of medical devices and systems. Technical standards and requirements for the design, construction and | operation of medic | al electrical | | | | | | |
| appliances. Class | sification classes of instruments. Electromagnetic Compatibility of Medical Devices. Modern component base. Design and constructio | n of basic blocks o | of medical | | | | | | |
| | devices. | | | | | | | | |
| BEEZM | Safety in Electrical Engineering for a master's degree | Z | 0 | | | | | | |
| The course provi | des for students of all programs periodic training guidelines for health and occupational safety and gives knowledge of electrical haza | ard of given branch | of study. | | | | | | |
| | Students receive indispensable qualification according to the current Directive of the Dean. | | | | | | | | |
| BEMPROJ6 | Diploma 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 specifi | ied by branch dep | artment or | | | | | | |
| | branch departments. The project will be defended within the framework of a subject. | | | | | | | | |

For updated information see http://bilakniha.cvut.cz/en/f3.html Generated: day 2025-11-07, time 01:23.