Recomended pass through the study plan

Name of the pass: Specialization Bioinformatics - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering

Department:

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

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 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	PV
		Min. cours.				
0040 MDIOEDDV4	Compulsory elective ubjects of the programme	4	Min/Max			
2018_MBIOEPPV1	BEAM31ADA,BEAM31ZAS, (see the list of groups below)	Max. cours.	24/24			PV
		4				

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 Roman mejla	Z,ZK	6	2P+2L	L	Р
BEAM33ZSL	Medical Imaging Systems Jan Kybic	Z,ZK	6	2P+2C	L	Р
BEAM31ZAS	Analog Signal Processing	Z,ZK	6	2P+2C	L	PV
2018_MBIOEPPV1	Compulsory elective ubjects of the programme BEAM31ADA,BEAM31ZAS, (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 Jan Kybic, Vratislav Fabián, Petr Pošík, Roman mejla Petr Pošík Roman mejla (Gar.)	Z	6	0p+6s	Z,L	Р
BEAM31ADA	Adaptive signal processing	Z,ZK	6	2P+2C	Z	PV

BEAM31MOA	Modeling and analysis of brain activity	Z,ZK	6	2P+2C	Z	PV	
2018_MBIOEPPV1	Compulsory elective ubjects of the programme BEAM31ADA,BEAM31ZAS, (see the list of groups below)	Min. cours. 4 Max. cours.	Min/Max 24/24			PV	
		4					
2018_MBIOEVOL	Elective cubicets	Min. cours.	Min/Max			V	Ī
ZOTO_IVIDIOL VOL	Elective subjects	0	0/999			V	

Number of semester: 4

Code

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
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 tion see here o	codes of members of this r below the list of courses)	Com	pletion	Credit	s Scope	Semester	Role
2018_MBI0	DEPPV1	Compulsory o	elective ubject	s of the programme		cours. 4 cours. 4	Min/Ma			PV
BEAM31ADA	Adaptive s	l ignal processing	BEAM31ZAS	Analog Signal Processing		BEAM17	EPM .	Applications o		etic
BEAM31AOL	Applied op	toelectronics in medic	BEAM02BIO	Biosensors		BE4M33	MPV	Computer Vis	ion Methods	
BEAM38KLS	Construction	on of Medical Systems	BE2M31DSPA	Digital Signal Processing		BEAM17	EMC	Introduction to	Electromagne	etic
BEAM33ZMO	Medical Im	age Processing	BEAM31MOA	Modeling and analysis of brain a		BEAM33	MOS	Modeling and	Simulation	
BEAM33NIN	Neuroinfor	matics	BEAM31NPG	Neurophysiology		BEAM02	FPT	Physics for Di	agnostics and	Ther
BE4M36SMU	Symbolic N	Machine Learning		•						

2018 MBIOEVOL	- 1 -1 -1 -1	Min. cours.	Min/Max		
2018_MBIOEVOL	Elective subjects	0	0/999		, v

List of courses of this pass:

Completion Credits

Name of the course

		-	
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 exami	nation.
BE2M31DSPA	Digital Signal Processing	Z,ZK	6
The subject gives of	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 cl	haracteristics in time and frequency domain, Fourier transform, fast algorithms for DFT computation, introduction to digital filter desig	n, digital filtering i	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. This	s course is also pa	ert of the
inter-university pro	ogramme prg.ai 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.		

BE4M36SAN | Statistical data analysis Z,ZK 6
This course builds on the skills developed in introductory statistics courses. It is practically oriented and gives an introduction to applied statistics. It mainly aims at multivariate statistical analysis and modelling, i.e., the methods that help to understand, interpret, visualize and model potentially high-dimensional data. It can be seen as a purely statistical counterpart to machine learning and data mining courses.

BE4M36SMU Symbolic Machine Learning

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 a

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 inference. 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, the last part will provide an introduction to several topics from the computational learning theory, including the online and batch learning settings.

BEAM02BIO	Biosensors	Z,ZK	6
	pioserisors ces the physical, electronic, biological principles of biosensors and provides information on past, present and future technologies. Vario		_
	c applications (such as detection of glucose, urea, proteins, cells, bacteria, etc.) are explained. In addition, the course introduces the us		
	s in biosensors to achieve reliable and sensitive devices for diagnosis at the point of care, in food safety or environmental monitoring. V		
	challenges and future perspectives for various applications of biosensors.		
BEAM02FPT	Physics for Diagnostics and Therapy	Z,ZK	6
	ents will be introduced to the problems of locomotive organs diseases and musculoskeletal pain in the first seven lectures. Great space is	•	rotherapeuti
	eutic ultrasound and phototherapy. Furthermore, advanced neurorehabilitation methods, especially transcranial brain stimulation methods		
agnetic stimulation	n of the brain - rTMS, transcranial electrical stimulation of the brain - tDCS and electroconvulsive therapy - ECT) are discussed. In the	second half of t	he semeste
attenti	ion is paid to the possibilities of using ionizing electromagnetic fields in medical diagnostics and therapy (eg X-ray, proton therapy, radi	otherapy, etc.).	_
BEAM17EMC	Introduction to Electromagnetic Compatibility	Z,ZK	6
The course dwells	s on problems of electromagnetic compatibility. Students obtain the basic knowledges in the field of electromagnetic compatibility - ele	ctromagnetic in	terference,
	susceptibility and testing methods. The course leads to gain professional skills in the field of electrical engineering.		1 -
BEAM17EPM	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 of biophysical aspects of EM field officets on biological systems migravery by northern a manufacture of field officets on biological systems of biological systems.		
i medicine. Salety	limits, clinical usage of EM field effects on biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems, microwave hyperthermia, measurement of dielectric parameters of biological systems.	ogicai lissues, E	ivi exposure
BEAM31ADA	Adaptive signal processing	Z,ZK	6
	Adaptive Signal processing des a basic discourse on adaptive algorithms for filtering, decorrelation, separation and beamforming. The course explains adaptive algorithms for filtering algorithms	•	
· · · · · · · · · · · · · · · · · · ·	g analysis, implementation and practical applications. Next, it describes the algorithms for adaptive decorrelation and separation of mu	-	
	the course provides analysis of adaptive beamforming techniques.		J Luot
BEAM31AOL	Applied optoelectronics in medicine	Z,ZK	6
BEAM31BSG	Biological signals	Z,ZK	6
	ed to the native and evoked biosignals used in clinical medicine and current methods of capturing, processing, recording and evaluating.	,	-
	portant biological signals, the students are introduced with their genesis, and nature and physiological characteristics of the signals re	-	
	its are introduced also with the physical and mathematical models. In laboratory exercises, students have the opportunity to capture the	•	
	their subsequent processing in MATLAB.		
BEAM31LET	Medical Instrumentation and Devices	Z,ZK	6
	fundamental principles applied within the modern medical devices and systems, esp. from the point of view of functional blocks and elec	tronic circuits o	f diagnostica
and therapeutical	I medical equipments including electrocardiographs, electroencephalographs, bedside and central monitors, equipments for anestesio	logy, intensive a	and critical
	ments for clinical laboratory, electrostimulators, cardiostimulators and defibrilators, blood pressure and flow measurement (including di		e ovymetry
neaithcare, equiph	nents for clinical laboratory, electrostimulators, cardiostimulators and denomiators, blood pressure and now measurement (including di	lution) and puls	C OXYTHCH y.
	Modeling and analysis of brain activity	ilution) and pulse	6
BEAM31MOA			
BEAM31MOA BEAM31NPG	Modeling and analysis of brain activity	Z,ZK Z,ZK	6
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