# 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: Common courses Garantor of the study branch: Program of study: Medical Electronics and Bioinformatics Type of study: Bachelor full-time Required credits: 170 Elective courses credits: 10 Sum of credits in the plan: 180 Note on the plan:

Name of the block: Compulsory courses in the program Minimal number of credits of the block: 146 The role of the block: P

Code of the group: 2018\_BBIOBAP Name of the group: Bachelor Project Requirement credits in the group: In this group you have to gain 20 credits Requirement courses in the group: In this group you have to complete 1 course Credits in the group: 20 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
BBAP20	Bachelor thesis Roman mejla Roman mejla (Gar.)	Z	20	12S	L,Z	Р

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20

Characteristics of the courses of this group of Study Plan: Code=2018\_BBIOBAP Name=Bachelor Project

BBAP20 Bachelor thesis

Code of the group: 2018\_BBIOP

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain 126 credits

Requirement courses in the group: In this group you have to complete 25 courses

Credits in the group: 126

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
BAB02BFY	Biophysics Lukáš Matera, Ladislav Sieger, Vratislav Fabián, Jaroslav Jíra Vratislav Fabián Vratislav Fabián (Gar.)	Z,ZK	4	2P+2L	L	Ρ
BAB34BMS	Biomedical sensors Miroslav Husák, Alexandr Laposa, Adam Bou a, Jan Novák <b>Miroslav Husák</b> Miroslav Husák (Gar.)	Z,ZK	4	2P+2L	z	Ρ
BAB02CHE	<b>Chemistry for Bioengineering</b> Jan Pech, Michal Mazur <b>Jan Pech</b> Jan Pech (Gar.)	Z,ZK	3	2P+1L	Z	Ρ
B0B01DRN	Differencial Equations and Numerical Analysis Petr Habala, Jakub Rondoš, Jakub Stan k, Daniel Gromada, Josef Dvo ák Petr Habala Petr Habala (Gar.)	Z,ZK	4	2P+2C	L	Р
B4M33DZO	<b>Digital image</b> Ond ej Drbohlav, Daniel Sýkora <b>Daniel Sýkora</b> (Gar.)	Z,ZK	6	2P+2C	Z,L	Ρ
B2B38EMBA	Electrical Measurements Jakub Svatoš Jakub Svatoš (Gar.)	Z,ZK	5	2P+2L	Z	Ρ
BAB17EMP	Electromagnetic Field Miloslav apek Miloslav apek (Gar.)	Z,ZK	5	2P+2C	Z	Ρ

B2B31EO1	Electronic Circuits 1 Ji í Hospodka, Michal Šimek, Jan Havlík <b>Ji í Hospodka</b> Ji í Hospodka (Gar.)	Z,ZK	4	2P+2L	L	Р
B3B02FY1A	Physics 1 Petr Koní ek, Michal Bedna ík Michal Bedna ík Michal Bedna ík (Gar.)	Z,ZK	7	4P+1L+2C	L	Р
B3B02FY2	Physics 2 Petr Koní ek, Michal Bedna ík, Marek Brothánek, Vojt ch Jandák Michal Bedna ík Michal Bedna ík (Gar.)	Z,ZK	6	3P+1L+2C	Z	Р
BAB31GEN	Genetics Eduard Ko árek Eduard Ko árek Eduard Ko árek (Gar.)	ZK	3	2P	Z	Р
B0B01KAN	Complex Analysis Zden k Mihula, Hana Tur inová Zden k Mihula Zden k Mihula (Gar.)	Z,ZK	5	2P+2S	Z	Р
B0B01LAGA	Linear Algebra Jakub Rondoš, Daniel Gromada, Josef Dvo ák, Ji í Velebil, Martin Bohata, Alena Gollová, Natalie Žukovec, Mat j Dostál <b>Ji í Velebil</b> Ji í Velebil (Gar.)	Z,ZK	7	4P+2S	Z	Р
B0B01MA1A	Mathematical Analysis 1 Josef Dvo ák, Martin Bohata, Veronika Sobotíková, Karel Pospíšil Veronika Sobotíková Veronika Sobotíková (Gar.)	Z,ZK	6	4P+2S	Z	Р
B0B01MA2	Mathematical Analysis 2 Hana Tur inová, Martin Bohata, Karel Pospíšil, Petr Hájek, Jaroslav Tišer, Miroslav Korbelá, Paola Vivi <b>Petr Hájek</b> Jaroslav Tišer (Gar.)	Z,ZK	7	4P+2S	L,Z	Р
B0B33OPT	Optimization Tomáš Werner, Petr Olšák, Mirko Navara, Tomáš Kroupa Tomáš Werner Tomáš Werner (Gar.)	Z,ZK	7	4P+2C	Z,L	Р
BAB36PRGA	Programming in C Jan Faigl Jan Faigl (Gar.)	Z,ZK	6	2P+2C	L	Р
BBPROJ4	Bachelor Project Roman mejla, Veronika Sobotíková, Radek Jan a, Jan Kybic Jan Kybic Roman meila (Gar.)	Z	4	4s	Z,L	Р
B4B33RPZ	Recognition and Machine Learning Ond ej Drbohlav, Ji í Matas, Jan Šochman Jan Šochman Ji í Matas (Gar.)	Z,ZK	6	2P+2C	Z	Р
B2B37SAS	Signals and systems Václav Navrátil, Karel Fliegel, Pavel Puri er Karel Fliegel Karel Fliegel (Gar.)	Z,ZK	5	2P+2C	L	Р
B0B01STP	Statistics and Probability Jakub Stan k, Miroslav Korbelá, Kate ina Helisová, Bogdan Radovi Kate ina Helisová Kate ina Helisová (Gar.)	Z,ZK	5	2P+2S	L	Р
BAB31AF1	<b>Fundamentals of Anatomy and Physiology I</b> Šárka Salavová, Kamila ížková <b>Šárka Salavová</b> Šárka Salavová (Gar.)	KZ	4	2P+2L	Z	Р
BAB31AF2	Fundamentals of Anatomy and Physiology II Kamila ížková Kamila ížková Kamila ížková (Gar.)	Z,ZK	4	2P+2L	L	Р
B2B31ZEOA	Fundamentals of Electric Circuits Roman mejla, Pavel Máša Roman mejla Roman mejla (Gar.)	Z,ZK	5	2P+2L	L	Р
BAB31ZZS	Basic Signal Processing Radek Jan a Radek Jan a Roman mejla (Gar.)	KZ	4	2P+2C	Z	Р
Characteristics of the	e courses of this group of Study Plan: Code=2018 BBIOP Name	=Compulso	rv subie	cts of the	program	me
BAB02BFY Bio		- computed	. y cubje	Z	ZK	4
The course is focused on ph	vsical processes associated with blood flow and blood gas exchange, including descrip	tion of events or	biological	membranes.	Further, the p	ossibilities
of measuring advanced hem	odynamic parameters of the bloodstream are discussed. A large space is devoted to the	e problems of he	emodialysis	and peritone	al dialysis. In	the second
part of the semester student	s are acquainted with the properties of human tissue and body fluids, including method	ls of their measu	rement. Th	is knowledge	is compleme	nted by the
basics of optics and acoustic	cs, always in relation to biological systems. Part of the course are laboratory exercises i	n a modern labo	ratory, whic	ch suitably co	mplement the	e theoretical
knowledge of students from	lectures.					
BAB34BMS   Bio	omedical sensors				,ZK	4
Sensors and microsensors u	used in biomedicine. Physical principles of operation of sensors and microsensors for se	ensing: temperat	ure, pressu licetion of a	ire, deformatio	on, vibration, nodicing, Nor	mechanical
Sensors and microsystems f	for biomedical diagnostics (Lab-on-chip. etc.)	nsor signals, app	lication of a			lotechnology.
BAB02CHE Ch	emistry for Bioengineering			7	7K	3
Students will learn the basic	areas of applied chemistry in biomedical engineering and technology. At the same time	e. this course will	introduce	other chemica	al disciplines.	Durina
laboratory exercises, studen	ts should acquire basic laboratory techniques used in chemical laboratories focused pri	imarily on the an	alysis of su	ubstances and	materials. L	aboratory
exercises are preceded by e	xercises focused on practical calculations for laboratory practice.	-	-			-
B0B01DRN Dif	ferencial Equations and Numerical Analysis			Z	.ZK	4
This course introduces stude	ents to the classical theory of ordinary differential equations (separable and linear ODEs	) and also to bsid	cs of nume	rical methods	, (errors in cal	culations and
stability, numerical solutions	of algebraic and differential equations and their systems). The course takes advantage	of the synnergy	between th	neoretical and	practical poi	nt of view.
B4M33DZO Dig	gital image			Z	,ZK	6
This course presents an ove	rview of basic methods for digital image processing. It deals with practical techniques the	hat have an inter	esting theo	oretical basis l	out are not di	fficult to
implement. Seemingly abstra	act concepts from mathematical analysis, probability theory, or optimization come to life	through visually	engaging	applications.	I he course fo	ocuses on
tundamental principles (sign	al sampling and reconstruction, monadic operations, histogram, Fourier transform, con-	volution, linear a	nd non-line	ar filtering) ar	nd more adva	nced editing
learn the theoretical knowled	succinity, deformation, registration, and segmentation. Students will practice the selected	eu topics through	i six impler	nentation task	s, which will	neip them
	age nom me recures and use it to solve practical problems			~	71/	F
	CUTICAL MEASULETTETTS	aductance) are -	voloined t-	aothor with		D Dir correct
application and accuracy est	timation. The course is closed by presenting information on several basic electronic mea	asuring instrume	nts and ex	plaining the fi	Indamentals	of magnetic
measurements and basic inf	ormation concerning measurement systems.					
BAB17EMP	ectromagnetic Field			7	.ZK	5
This course gets its students	s acquinted with principles and applied electromagnetic field theory basics.			1 4	, <b></b>	U

The second interview in the size of the second in the second field of the second size of	Z,ZK	4
The course introduces basic circuits with operational amplifiers, continues with the description of linear systems, analysis of their characteristics a	and fundamentals of syn	thesis frequency
filters. It deals with the principles and features of circuits for generating signals and a controlled oscillator including the PLL circuit and its use.	The last part of the cour	se is devoted to
	771/	7
B3BUZE Y TA Priviles at the Excultured Electrical Engineering. Physics 1, is devoted to the introduction into two important areas of physics	C, ΔΛ   C, ΔΛ   C, ΔΛ	/ sical machanics
and the second one is the electric and magnetic field. Within the framework of the classical mechanics, the students study the particle kinematic:	s: dvnamics of the mass	particle. system
of mass particles and rigid bodies. The students should be able to solve basic problems dealing with the description of mechanical systems, w	hich they can meet duri	ng their further
studies. The classical mechanics is followed by the relativistic mechanics, electric and magnetic field - both stationary as well as non-stationary	y. The students can use	the facts gained
in this course in the study of electrical circuits, theory of electrotechnical materials or radioelectronics. Apart of this, the knowledge gained in the	is course is required for	the study of the
consecutive course Physics 2.		
B3B02FY2   Physics 2	Z,ZK	6
The course Physics 2 is closely linked with the course Physics 1. Within the framework of this course the students will first of all learn foundation the theory of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand the students and the students are students at the students are students.	ons of thermodynamics.	Following topic
- the theory of waves - will give to the students basic insight into the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves and will help to the students to understand that the properties of waves are the subjects of the following the properties of waves are the subjects of the following the properties of the waves are the subjects of the following the properties of waves are the subjects of the following the properties of the proper	esented description of t	chanics and
nuclear physics will complete the student?s general education in physics. The knowledge gained in this course will help to the students in stud	v of such modern areas	as robotics.
computer vision, measuring technique and will allow them to understand the principles of novel technologies and functioning of new electronic	devices.	,
BAB31GEN Genetics	ZK	3
The subject provides students of technical dsciplines with basic information about genetics with an emphasis on modern genetic disciplines ar	nd knowledge that is clo	sely related to
the issue of medical electronics and especially bioinformatics. The focus is on the organization and function of the human genome, including it	s possible pathologically	/ significant
changes and the techniques used to determine them. Students will also learn basic information about clinical genetics, genetic counseling, genetic students will also learn basic information about clinical genetics.	netic testing, as well as	their possible
ethical and legal issues. The conclusion of the course also deals with original and modern approaches enabling targeted editing of the genome	e, especially the so-calle	ed gene therapy.
the teaching	ally prokaryotes and vi	uses - is part of
B0B01KAN Complex Analysis	7 7K	5
The course is an introduction to the fundamentals of complex analysis and its applications. The basic principles of Fourier, Laplace, and Z-tran	isform are explained, ind	cluding their
applications, particularly to solving differential and difference equations.	• •	0
B0B01LAGA Linear Algebra	Z,ZK	7
The course covers introductory topics of linear algebra. It begins with fundamental concepts related to vector spaces and linear transform (such a	as linear dependence an	d independence
of vectors, bases, coordinates of vectors, etc.). The next part of the course is devoted to matrix theory (determinants, inverse matrix, matrices of	of linear transformation,	eigenvalues and
eigenvectors). Applications include solving systems of linear equations, geometry in three-dimensional space (including dot and cross products	s), and the singular value	e decomposition
of a matrix.		
B0B01MA1A   Mathematical Analysis 1	Z,ZK	6
I his is an introductory course to differential and integral calculus of functions of one real variable.	771	7
BUBU1MA2 Mathematical Analysis 2	L,ZK	/
The subject covers an introduction to the differential and integral calculus in several variables and basic relations between curve and surface in series and power series with application to Taylor and Fourier series	negrais. Other part com	
BOB33OPT Ontimization	7 7K	7
The course provides an introduction to mathematical optimization, specifically to optimization in real vector spaces of finite dimension. The theory	is illustrated with a num	ber of examples.
You will refresh and extend many topics that you know from linear algebra and calculus courses.		
BAB36PRGA Programming in C	Z,ZK	6
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BAB36PRGA         Programming in C           The course targets to gain a deep, comprehensive knowledge of the C programming language in terms of program operation, access and mem of multi-threaded applications. The course emphasizes acquiring programming habits for creating readable and reusable programs. Students g	C,ZK   nory management, and t get acquainted with the o	6 he development compilation of
BAB36PRGA   Programming in C The course targets to gain a deep, comprehensive knowledge of the C programming language in terms of program operation, access and merr of multi-threaded applications. The course emphasizes acquiring programming habits for creating readable and reusable programs. Students get the source codes and their debugging. Lectures are based on the presentation of basic software constructs and demonstration of motivational pro-	Z,ZK   nory management, and to get acquainted with the o ograms with practical co	6 he development compilation of nstructs pointing
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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
B0B04B1K	English language B1 - classified assessment Markéta Havlí ková, Pavla Péterová, Erik Peter Stadnik, Michael Ynsua, Dana Saláková, Petra Juna Jennings <b>Petra Juna Jennings</b> Petra Juna Jennings (Gar.)	KZ	0	0C	Z,L	Ρ
B0B04B2Z	English language B2 - exam Markéta Havlí ková, Michael Ynsua, Dana Saláková, Petra Juna Jennings Petra Juna Jennings Petra Juna Jennings (Gar.)	Z,ZK	0	0C	Z,L	Р

#### Characteristics of the courses of this group of Study Plan: Code=2015\_BZAJ Name=Exam from the english language

B0B04B1K	English language B1 - classified assessment	KZ	0
verifying of the student	s skills of B1 level		
B0B04B2Z	English language B2 - exam	Z,ZK	0
I) The B2 English Exam	is a compulsory subject for all Faculty of Electrical Engineering students at the Czech Technical University. According to the	Study and Exami	nation Rules and
Regulations for Student	s at CTU (Part III, Article 4), a compulsory subject is one whose completion is a necessary condition in order to successfully	complete the stud	ly programme. In
addition, this requires th	e passing of an examination evaluated on the scale A, B, C, D, or E (SERR Part III, Article 6). II) According to the Common E	European Framew	ork of Reference
for Languages (CEFR),	an international standard for describing language ability, the definition of an English language learner who has achieved the	B2 (Upper-Intern	nediate) level is
one who can understan	d the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specia	lisation. Can inter	act with a degree
of fluency and spontane	ity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detaile	ed text on a wide i	ange of subjects
and explain a viewpoint	on a topical issue giving the advantages and disadvantages of various options. III) Students who have successfully passed	an approved inter	national exam
within the past five years	s may present their certificate to the Department of Languages, Faculty of Electrical Engineering.Upon approval, students are	then exempt from	both the Written
Test and the Oral Part.	For a list of approved international exams go the department website: http://jazyky.fel.cvut.cz/		

## 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\_BBIOPV

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain at least 14 credits (at most 85) Requirement courses in the group: In this group you have to complete at least 3 courses Credits in the group: 14

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
B4B33ALG	Algorithms Marko Genyk-Berezovskyj, Daniel Pr ša Daniel Pr ša Marko Genyk-Berezovskyj (Gar.)	Z,ZK	6	2P+2C	Z	PV
BAB37APO	Applied Optics Petr Páta, Jan Bedná, Lukáš Krauz Jan Bedná Petr Páta (Gar.)	Z,ZK	4	2P+2L	L	PV
2241068	Biomechanics for Bachelors	Z,ZK	3	2P+2C		PV
BAB34BSP	Biomedical Sensors Practically Alexandr Laposa, Adam Bou a Adam Bou a (Gar.)	KZ	4	2P+2L	Z	PV
B0B36DBS	Database Systems Martin imná, Václav Kratochvíl Martin imná Martin imná (Gar.)	Z,ZK	6	2P+2C+4D	L	PV
B2B31EO2	Electronic Circuits 2 Ji í Hospodka Ji í Hospodka Ji í Hospodka (Gar.)	Z,ZK	4	2P+2L	Z	PV
B3B33KUI	<b>Cybernetics and Artificial Intelligence</b> Tomáš Svoboda, Petr Pošík <b>Tomáš Svoboda</b> Tomáš Svoboda (Gar.)	Z,ZK	6	2P+2C	L	PV
B3B38LPE	Laboratories of Industrial Electronics and Sensors Jan Fischer, Tomáš Drábek, Michal Janošek, Vojt ch Petrucha Vojt ch Petrucha Vojt ch Petrucha (Gar.)	КZ	4	0P+4L	L	PV
B3B33LAR	Laboratory of robotics Vladimír Petrík, Pavel Krsek, Libor Wagner Pavel Krsek Pavel Krsek (Gar.)	KZ	4	0P+4L	L	PV
B0B01LGR	Logic and Graphs Alena Gollová, Natalie Žukovec, Mat j Dostál Alena Gollová Marie Demlová (Gar.)	Z,ZK	5	3P+2S	Z,L	PV

BAB34MNS	Miroslav Husák, Alexandr Laposa, Adam Bou a <b>Miroslav Husák</b> Miroslav Husák (Gar.)	Z,ZK	4	2P+2L	Z	PV
B2B34MIK	Microcontrollers Jan Novák, Tomáš Teplý, Vladimír Janí ek <b>Tomáš Teplý</b> Vladimír Janí ek (Gar.)	Z,ZK	4	2P+2C	Z	PV
B4B38NVS	Embedded Systems Design Jan Fischer, Vojt ch Petrucha Jan Fischer Jan Fischer (Gar.)	Z,ZK	6	2P+2L	Z	PV
B4B01NUM	Numerical Analysis Mirko Navara, Aleš N me ek Mirko Navara Mirko Navara (Gar.)	Z,ZK	6	2P+2C	Z	PV
B3B33ROB	Robotics	Z,ZK	5	2P+2L	Z	PV
B2B17TBK	Wireless Communication Technique P emysl Hudec, Pavel Pecha, Tomáš Ko ínek, Viktor Adler, Václav Kabourek, Jan Spá il P emysl Hudec P emysl Hudec (Gar.)	KZ	4	2P+2L	L	PV
B0B02UAK	Introduction to Acoustic Marek Brothánek, Ond ej Ji í ek Ond ej Ji í ek (Gar.)	KZ	4	2P+2L	L	PV
B4B36ZUI	Introduction to Artificial Intelligence Viliam Lisý, Branislav Bošanský Branislav Bošanský Michal P chou ek (Gar.)	Z,ZK	6	2P+2C	L	PV
Characteristics of t	the courses of this group of Study Plan: Code=2018 BBIOPV Nan	ne=Compuls	orv subi	ects of th	e progra	mme
B4B33ALG	Algorithms	•	<u> </u>	Z	,ZK	6
In the course, the algorith types a data structures, b	hims development is constructed with minimum dependency to programming language; new pasic algorithms, recursive functions, abstract data types, stack, queues, trees, searching,	vertheless the lec sorting, special a	tures and s application a	eminars are algorithms, D	based on Ja ynamic prog	va. Basic data Iramming.
Students are able to desi	gn and construct non-trivial algorithms and to evaluate their effectivity.				71/	4
BAB37APO	Applied Optics				.,ZK	4
2241068	Biomechanics for Bachelors			Z	.,ZK	3
The aim of the course is	BIOMEDICAL SENSORS PRACTICALLY to gain experience with design implementation and testing of practical constructions with	sensors for biom	edical appli	cations and v	K∠   vith regard to	4 o the needs of
students of FEE who will	realize the practical final work.				inin rogana a	
B0B36DBS	Database Systems			Z	"ZK	6
The course is designed a	is a basic database course mainly aimed at the student ability to design a relational data n	nodel and to use	the SQL lar	nguage for da	ata definition	as well as for
data querying and to cho	ose the appropriate degree of transaction isolation. Students will also get acquainted with	the most commo	nly used in	dexing techn	iques, datab	ase system
architecture and their ma	nagement. They will verify their knowledge during the elaboration of a continuously submit	tted seminar task	•	7		4
B2B31EO2	Electronic Circuits 2 basic electric circuits course. It introduces multistage transister amplifiers and basic appli	ations in the field	d of oloctror	L I	.,∠K   Students her	4 como familiar
with design and measure	ment of electronic systems, including nonlinear applications with regard to the real charac	teristics of opera	tional ampli	fiers. Next or	perating prin	ciples and
parameters of power amp	blifiers, linear stabilizers, switching power supply and D/A and A/D converters are presents	3.	uona ampi		or a mag prime	oipiee and
	- · · · · ·					
B3B33KUI	Cybernetics and Artificial Intelligence	-		Z	"ZK	6
B3B33KUI The course introduces th	Cybernetics and Artificial Intelligence e students into the field of artificial intelligence and gives the necessary basis for designin	g machine contro	ol algorithms	Z s. It advance:	,ZK	6 dge of state
B3B33KUI The course introduces th space search algorithms	Cybernetics and Artificial Intelligence e students into the field of artificial intelligence and gives the necessary basis for designin by including uncertainty in state transition. Students are introduced into reinforcement lea	g machine contro	ol algorithms problems wh	Z s. It advances then the state	S,ZK	6 dge of state are unknown,
B3B33KUI The course introduces th space search algorithms which also connects the algorithms	Cybernetics and Artificial Intelligence e students into the field of artificial intelligence and gives the necessary basis for designin by including uncertainty in state transition. Students are introduced into reinforcement lear artificial intelligence and cybernetics fields. Bayesian decision task introduces supervised	g machine contro rning for solving p learning. Learning	ol algorithms problems wi g from data	It advances nen the state is demonstra	,ZK s the knowle transitions a ated on a line	6 dge of state are unknown, ear classifier.
B3B33KUI The course introduces th space search algorithms which also connects the alg Students practice the alg B3B38I PE	Cybernetics and Artificial Intelligence e students into the field of artificial intelligence and gives the necessary basis for designin by including uncertainty in state transition. Students are introduced into reinforcement lear artificial intelligence and cybernetics fields. Bayesian decision task introduces supervised oritms in computer labs.	g machine contro rning for solving p learning. Learning	ol algorithms problems wh g from data	Z s. It advances nen the state is demonstra	t,ZK s the knowle transitions a ated on a lin	6 dge of state are unknown, ear classifier.
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B3B33KUI         The course introduces the space search algorithms which also connects the alg         Students practice the alg         B3B38LPE         The objective of the "Lab processing circuits, analot to the user within the cond 3 or 4 members. During this laboratory coud 3 or 4 members. During this cooperation and comm         B0B01LGR         This course covers basics and of the relationship be         BAB34MNS         The content of the course in biomedicine, microsurg principles and quantities processing, linearization, modern solutions in biom micromanipulation, micro         B2B34MIK         The goal of this course is program their own applice         B4B38NVS         The course deals with de         B4B01NUM         The course introduces to the the course in biomedicine in the course in biomedicine.	Cybernetics and Artificial Intelligence e students into the field of artificial intelligence and gives the necessary basis for designin by including uncertainty in state transition. Students are introduced into reinforcement lead artificial intelligence and cybernetics fields. Bayesian decision task introduces supervised loritms in computer labs. Laboratories of Industrial Electronics and Sensors oratories" is to introduce students in a playful and interactive way with basic blocks of an in g to digital signal conversion, software processing by a microcontroller up to the sending of cept "Internet of Things". Laboratory of robotics urses the students are introduced with the practical robotics through solving of practical ta- he semester, each group of students jointly solve one practical problem in the field of robo a robots). The students should utilize the basic knowledge obtained in previous study (eg. r orm few tasks with different specialization, which are announced each semester. Tasks differ unication in the student team. Logic and Graphs s of mathematical logic and graph theory. Syntax and semantics of propositional and predicat stween a formula and its model is stressed. Further, basic notions from graph theory are in ea are knowledge of new principles of operation of components and systems with micro-dim gery, etc. The course points to new possibilities of implementation and application of integrat using mainly MEMS technology. Physical principles of operation of microsystems and mic calibration, system intelligence, applications of microactuators (electrostatic, piezoelectric, t iedicine, action elements in conjunction with sensors, whose operation is based on basic p robots. The course presents the principles of touch screens, energy microgenerators. Microcontrollers to make students acquainted with recent interesting applications, smart sensors circuits a ations and measure actual properties. Because of usage of a programming language C it Embedded Systems Design usign of embedded systems using ARM	g machine contro rning for solving p learning. Learning industrial sensor s the results to the sks. Students are denathematics, phy rs between seme: te logic are introd itroduced. hensions, microsy ed microcompon- roactuators, class hermal, chemical ohysical and bioc	el algorithms problems wi g from data system - froi superior sys e working in esigned to ir sics, electro sters. An int uced. The in vstems, mic ents working sification, pa and bioche hemical prir andled by n o focus on th gration, sol	Z s. It advances hen the state is demonstration m the sensor tem or datab laboratories htroduce stud onics, softwa egral part of Z nportance of Z rosensors ar g with various arameters, de mical, optical nciples, inclu Z nicrocontrolle P Z Ution of trans	ZK       ,         s the knowle e transitions a ated on a lin         KZ       in         r itself, throu base and the         KZ       in         KZ       in         in groups wild dents with ro         dents with ro         re developm         the solution of         Z,ZK         and microacture         s physical an esign, integration, integration of the reed could basic and the first of the reed could basi	6 dge of state are unknown, ear classifier. 4 gh signal ir presentation 4 nich consist of botics ent). Students of the problem 5 consequence 4 ators usable d biochemical ation, signal rse introduces oplications in 4 students will alization. 6 4 ators and
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B2B17TBK Wireless Communication Technique	KZ	4
Wireless communications belong to the fastest developing technical fields. Besides widely used mobile telephony systems, this field also includes man	y other both mobi	le and stationary
communicating systems. Different types of radio modems are also built in the majority of electronic devices like PCs, tablets, notebooks, cameras, etc	c. With expected f	ast development
of Internet of Things, operation of billions of wireless sensors is expected. The subject is common to all students of the Electronics and Communicatio	n study program,	its main purpose
is to teach all important aspects of this technical branch. Obtained knowledge should enable the students to design, project, adjust or manufacture an	y wireless comm	unication system
or its components. Besides wireless system analysis, the lectures include review of physical backgrounds, survey of the most important existing radio sy	stems together wi	th corresponding
operational frequencies, description of electromagnetic wave propagation and related antennas. Instructions concerning propagation also cover beh	avior of EM wave	s in an urban
environment or inside buildings. Lectures concerning analysis of typical wireless systems also cover description of related radio-frequency, microway	e and mm-wave	circuits and
components. Exercises include practical calculations of wireless systems, computer analysis and synthesis of important structures and circuits, and	related laboratory	measurements.
B0B02UAK Introduction to Acoustic	KZ	4
The subject provides overview of main parts of acoustics. In first lectures there is introduction to basic types of sound fields, its solutions and proper	ties. Next chapter	deals with
introduction to building and room acoustics. The second half of the course deals with introductions to physiological acoustics, psychoacoustics, musi	cal acoustics, hyo	giene legislation
and ultrasound, infrasound and their measurement.		
B4B36ZUI Introduction to Artificial Intelligence	Z,ZK	6
The aim of the course is to cover the basics of symbolic artificial intelligence. We will focus on algorithms of informed and uninformed state space se	arch, problem rep	presentation and
solving, representation of knowledge using formal logic, methods of automated reasoning, and an introduction to Markov decision making, and to tw	o-player games. 7	This course is
also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students with a deeper and broader in	sight into the field	of artificial
intelligence. More information is available at https://prg.ai/minor.		
Code of the group: 2018_BBIOPROG		
Name of the group: Programing		
Requirement credits in the group: In this group you have to gain at least 6 credits (at me	ost 12)	
Requirement courses in the group: In this group you have to complete at least 1 course	( at most	2)
Credits in the group: 6	,	,
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
B3B33ALP	Algorithms and Programming Vojt ch Vonásek Vojt ch Vonásek (Gar.)	Z,ZK	6	2P+2C	Z	PV
BAB37ZPR	Programming Essentials Stanislav Vítek Stanislav Vítek (Gar.)	Z,ZK	6	2P+2C	Z	PV

#### Characteristics of the courses of this group of Study Plan: Code=2018\_BBIOPROG Name=Programing

B3B33ALP	Algorithms and Programming	Z,ZK	6				
This subject will give students a basic understanding of algorithms and programming and teach them to design, implement and test algorithms for simple tasks. The students will							
understand the notion of computational complexity. They will learn about basic program building blocks such as loops, conditional statements, variables, functions and recursion. We							
will introduce the most often used data structures (queue, stack, list, array etc) and operations on them. We will show the basic algorithms, for example for searching and sorting.							
Students will learn to write simple programs in Python.							
BAB37ZPR	Programming Essentials	Z,ZK	6				

## Code of the group: 2018\_BBIOMP

Name of the group: Introduction to Engineering

Requirement credits in the group: In this group you have to gain at least 4 credits (at most 8) Requirement courses in the group: In this group you have to complete at least 1 course (at most 2) Credits in the group: 4

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
BAB31UBI	Introduction to bioengineering Jan Kybic, Michal Novotný, Jan Holub, Petr Ježdík, Ji í Kléma Michal Novotný Michal Novotný (Gar.)	KZ	4	2P+2L	z	PV
B2B15UELA	Introduction to Electrical Engineering Zden k Müller, Pavel Hrzina Pavel Hrzina Zden k Müller (Gar.)	KZ	4	2P+1L	Z	PV

#### Characteristics of the courses of this group of Study Plan: Code=2018\_BBIOMP Name=Introduction to Engineering

BAB31UBI	Introduction to bioengineering	KZ	4	
The course presents the basics of biomedical engineering and provides illustrative examples of projects performed by the faculty teams.				
B2B15UELA	Introduction to Electrical Engineering	KZ	4	
The course expands students knowledge of topics in power engineering. It provides a basic overview of the electricity production, transmission, distribution, and consumption chain,				
ntroduces the principles of electrical machines, and broadens understanding of materials used in electrical engineering.				

Name of the block: Elective courses Minimal number of credits of the block: 0 The role of the block: V 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
B0B16ET1	Ethic 1 Vladimír Sláme ka Vladimír Sláme ka Vladimír Sláme ka (Gar.)	KZ	4	2P+2C	Z	V
B0B16FIL	Philosophy Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)	ZK	2	2P+0S	Z,L	V
B0B16FI1	Philosophy 1 Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)	KZ	4	2P+2S	Z	V
B0B16HTE	History of technology and economic Marcela Efmertová, Jan Mikeš Marcela Efmertová Marcela Efmertová (Gar.)	ZK	2	2P+0S	Z,L	V
B0B16HT1	History of science and technology 1 Marcela Efmertová, Jan Mikeš Marcela Efmertová Marcela Efmertová (Gar.)	KZ	4	2P+2S	Z	V
B0B16HI1	History 1 Milena Josefovi ová Milena Josefovi ová Milena Josefovi ová (Gar.)	KZ	4	2P+2S	Z	V
B0B16MPS	<b>Psychology</b> Jan Fiala <b>Jan Fiala</b> Jan Fiala (Gar.)	Z,ZK	4	2P+2S	Z,L	V
B0B16MPL	Psychology for managers Jan Fiala Jan Fiala Jan Fiala (Gar.)	ZK	2	2P+0S	Z,L	V
A003TV	Physical Education Ji í Drnek	Z	2	0+2	L,Z	V

### Characteristics of the courses of this group of Study Plan: Code=2018\_BBIOH Name=Humanities subjects

B0B16ET1	Ethic 1	KZ	4	
Aim of this subject is to	Aim of this subject is to provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving various situations of human life. Es			
parts of the subject are	parts of the subject are discussions in which students can react to lectures but also to actual questions coming with news and look for the communal answers.			
B0B16FIL	Philosophy	ZK	2	
We deal with the most i	important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philos	ophy and conne	ction of old	
philosophical thoughts	with recent problems of science, technology, economics and politics.			
B0B16FI1	Philosophy 1	KZ	4	
We deal with the most i	important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philos	ophy and conne	ction of old	
philosophical thoughts	with recent problems of science, technology, economics and politics.			
B0B16HTE	History of technology and economic	ZK	2	
B0B16HT1	History of science and technology 1	KZ	4	
B0B16HI1	History 1	KZ	4	
B0B16MPS	Psychology	Z,ZK	4	
B0B16MPL	Psychology for managers	ZK	2	
A003TV	Physical Education	Z	2	

Code of the group: 2015\_BJKA Name of the group: English language courses 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
B0B04A21	English Language A2-1 Dana Saláková	Z		2s	Z	V
B0B04A22	English Language A2-2 Dana Saláková	Z	0	2s	L	V
B0B04B11	English Language B1-1 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	0	2C	Z	V
B0B04B12	English Language B1-2 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	0	2C	L	V
B0B04B21	English Language B2-1 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	3	2C	Z	V

B0B04B22	English Lan Petra Juna J	guage B2-2 ennings Petra Juna Jennings (Gar.)	Z	3	2C	Z,L	V
Characteristics of	of the courses of t	nis group of Study Plan: Code=2015_BJKA	Name=English la	nguage c	ourses		
B0B04A21	English Languag	e A2-1	•		Ì	Z	
The course is open to	students who are beginn	ers in their second language. Course objective: Achieving	competence in basic Eng	glish.	I	I	
B0B04A22	English Languag	e A2-2		-		Z	0
The course is open to	students who are beginn	ers in their second foreign language. The course objective	is to develop and sustair	n their basic l	knowledge o	f the English	n language.
B0B04B11	English Languag	e B1-1				Z	0
Course objective: Broa	adening the basic knowled	dge of general English; mastering basic specialised langua	je; focusing on text analys	sis and vocab	ulary expan	sion; unders	tanding spoken
English.							
B0B04B12	English Languag	e B1-2				Z	0
Course objective: Broa	adening the basic knowled	dge of general English; mastering basic specialised language	e; focusing on text analys	sis and vocab	ulary expan	sion; unders	tanding spoken
English.							
B0B04B21	English Languag	e B2-1				Z	3
This course is designed	ed as a full-year, two sem	ester preparation course for the universitys compulsory B2	-level English Examinatio	n (Anglický j	azyk B2 - zk	ouška - B0B	04B2Z*). While
the course is focused	on helping students reac	h a level required to pass the B2-level English Examination	n (or improve their English	h for a higher	mark), it als	so focuses n	nore on the
academic and technic	al vocabulary and gramm	ar expected of students at the university level. "NOTE: This	exam is also used for det	ermining an a	appropriate I	evel of Engli	sh for Erasmus
	En allah Lananaan	- D0 0				7	
BUBU4B22		e BZ-Z	loval English Examination	n (Anglioký ig			3 04P27 *\ \\/bilo
the course is focused	on helping students reac	h a level required to pass the B2-level English Examination	or improve their English	h for a higher	mark) it als	so focuses n	nore on the
academic and technic	al vocabulary and gramm	ar expected of students at the university level. *NOTE: This	exam is also used for det	ermining an a	appropriate l	evel of Engli	ish for Erasmus
/ International Study.	ar rooabalar y ana grainn			orrinning arr	appropriate .	ererer Engli	
Code of the c		20/0					
	100p.2010_DL						
Name of the	group: Elective	subjects					
Requirement	credits in the c	Iroup:					
Requirement	courses in the	aroun.					
Credite in the		9.04p.					
Creatis in the	group: 0						
Note on the g	Iroup:	~Nabídku volitelných předmětů uspo http://www.fel.cvut.cz/cz/education/v	řádaných podle ka olitelne-predmety	iteder naj .html\\	dete na v	webovýc	h stránkách

Code	Name of the course	Completion	Credits	
2241068	Biomechanics for Bachelors	Z,ZK	3	
A003TV	Physical Education	Z	2	
B0B01DRN	Differencial Equations and Numerical Analysis	Z,ZK	4	
This course introdu	ces students to the classical theory of ordinary differential equations (separable and linear ODEs) and also to bsics of numerical meth	nods (errors in calc	ulations and	
stability, numerica	I solutions of algebraic and differential equations and their systems). The course takes advantage of the synnergy between theoretic	al and practical po	int of view.	
B0B01KAN	Complex Analysis	Z,ZK	5	
The course is an	introduction to the fundamentals of complex analysis and its applications. The basic principles of Fourier, Laplace, and Z-transform a	are explained, inclu	iding their	
	applications, particularly to solving differential and difference equations.			
B0B01LAGA	Linear Algebra	Z,ZK	7	
The course covers i	ntroductory topics of linear algebra. It begins with fundamental concepts related to vector spaces and linear transform (such as linear d	lependence and inc	dependence	
of vectors, bases, c	oordinates of vectors, etc.). The next part of the course is devoted to matrix theory (determinants, inverse matrix, matrices of linear tra	ansformation, eige	nvalues and	
eigenvectors). Appl	ications include solving systems of linear equations, geometry in three-dimensional space (including dot and cross products), and the	e singular value de	composition	
	of a matrix.			
B0B01LGR	Logic and Graphs	Z,ZK	5	
This course covers	basics of mathematical logic and graph theory. Syntax and semantics of propositional and predicate logic are introduced. The importanc	e of the notion of c	onsequence	
	and of the relationship between a formula and its model is stressed. Further, basic notions from graph theory are introduce	d.		
B0B01MA1A	Mathematical Analysis 1	Z,ZK	6	
	This is an introductory course to differential and integral calculus of functions of one real variable.			
B0B01MA2	Mathematical Analysis 2	Z,ZK	7	
The subject cover	s an introduction to the differential and integral calculus in several variables and basic relations between curve and surface integrals.	Other part contain	ns function	
	series and power series with application to Taylor and Fourier series.			
B0B01STP	Statistics and Probability	Z,ZK	5	
The aim of the co	ourse is to introduce students to the fundamentals of probability theory and mathematical statistics, their computational methods as v	well as applications	s of these	
	mathematical tools to practical examples.			
B0B02UAK	Introduction to Acoustic	KZ	4	
The subject prov	ides overview of main parts of acoustics. In first lectures there is introduction to basic types of sound fields, its solutions and propert	ies. Next chapter d	eals with	
introduction to building and room acoustics. The second half of the course deals with introductions to physiological acoustics, psychoacoustics, musical acoustics, hygiene legislation				
	and ultrasound, infrasound and their measurement.			

List of courses of this pass:

B0B04A21	English Language A2-1	Z	
	The course is open to students who are beginners in their second language. Course objective: Achieving competence in basic E	nglish.	
B0B04A22 The course is op	English Language A2-2 en to students who are beginners in their second foreign language. The course objective is to develop and sustain their basic knowle	∠ dae of the English	language.
B0B04B11	English Language B1-1	Z	0
Course objective: E	Broadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary exp English.	ansion; understan	ding spoken
B0B04B12	English Language B1-2	Z	0
Course objective: E	Broadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary exp English.	ansion; understan	ding spoken
B0B04B1K	English language B1 - classified assessment verifying of the student's skills of B1 level	KZ	0
B0B04B21	English Language B2-1		3
the course is foc	used on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark)	. it also focuses m	ore on the
academic and tech	nical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropria / International Study.	ate level of English	for Erasmus
B0B04B22	English Language B2-2	Z	3
This course is designed the course is focu	gned as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2 - used on beloing students reach a level required to pass the B2-level English Examination (or improve their English for a bigher mark)	zkouška - B0B04B	32Z *). While
academic and tech	nical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropria	ate level of English	for Erasmus
B0B04B2Z	English language B2 - exam	7.7K	0
I) The B2 English E	Exam is a compulsory subject for all Faculty of Electrical Engineering students at the Czech Technical University. According to the Students	dy and Examinatio	n Rules and
Regulations for Stu	Idents at CTU (Part III, Article 4), a compulsory subject is one whose completion is a necessary condition in order to successfully com	plete the study pro	ogramme. In
for Languages (CI	es the passing of an examination evaluated on the scale A, B, C, D, or E (SERR Part III, Article 6). II) According to the Common Euro FER) an international standard for describing language ability, the definition of an English language learner who has achieved the B2	pean Framework o (Upper-Intermedi	ate) level is
one who can under	stand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisat	tion. Can interact w	ith a degree
of fluency and spor	ntaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed to	ext on a wide range	e of subjects
and explain a view	wpoint on a topical issue giving the advantages and disadvantages of various options. III) Students who have successfully passed an years may present their certificate to the Department of Languages. Eaculty of Electrical Engineering Linon approval, students are the	approved internati	ional exam
within the past live	Test and the Oral Part. For a list of approved international exams go the department website: http://jazyky.fel.cvut.cz/	in exempt noin bou	
B0B16ET1	Ethic 1	KZ	4
Aim of this subject parts o	is to provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving various situ f the subject are discussions in which students can react to lectures but also to actual questions coming with news and look for the co	ations of human lit ommunal answers.	fe. Essential
B0B16FI1	Philosophy 1	KZ	4
We deal with the	e most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philos philosophical thoughts with recent problems of science, technology, economics and politics.	ophy and connecti	ion of old
B0B16FIL	Philosophy	ZK	2
We deal with the	e most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophical thoughts with recent problems of science, technology, economics and politics	ophy and connecti	ion of old
B0B16HI1	History 1	KZ	4
B0B16HT1	History of science and technology 1	KZ	4
B0B16HTE	History of technology and economic	ZK	2
B0B16MPL	Psychology for managers	ZK	2
B0B16MPS	Psychology	Z,ZK	4
B0B33OPT	Optimization	Z,ZK	7
I ne course provide	s an introduction to mathematical optimization, specifically to optimization in real vector spaces of finite dimension. The theory is illustrative vector spaces of finite dimension. The theory is illustrative vector spaces of finite dimension of the theory is illustrative vector spaces of finite dimension.	led with a number of	or examples.
B0B36DBS	Database Systems	Z,ZK	6
The course is desig	gned as a basic database course mainly aimed at the student ability to design a relational data model and to use the SQL language f	or data definition a	s well as for
data querying and	to choose the appropriate degree of transaction isolation. Students will also get acquainted with the most commonly used indexing architecture and their management. They will verify their knowledge during the elaboration of a continuously submitted seminar	techniques, databa r task.	ase system
B2B15UELA	Introduction to Electrical Engineering	KZ	4
The course expan	ds students knowledge of topics in power engineering. It provides a basic overview of the electricity production, transmission, distribu-	ution, and consump	otion chain,
B2B17TBK	Wireless Communication Technique	K7	4
Wireless communio	cations belong to the fastest developing technical fields. Besides widely used mobile telephony systems, this field also includes many of	ther both mobile an	d stationary
communicating sys	stems. Different types of radio modems are also built in the majority of electronic devices like PCs, tablets, notebooks, cameras, etc. W	/ith expected fast d	levelopment
of Internet of Thing	s, operation of billions of wireless sensors is expected. The subject is common to all students of the Electronics and Communication st reart aspects of this technical branch. Obtained knowledge should enable the students to design, project, adjust or manufacture any w	udy program, its m	ain purpose
or its components.	Besides wireless system analysis, the lectures include review of physical backgrounds, survey of the most important existing radio system	ms together with co	rresponding
operational frequ	encies, description of electromagnetic wave propagation and related antennas. Instructions concerning propagation also cover behave	vior of EM waves in	n an urban
environment or i	nside buildings. Lectures concerning analysis of typical wireless systems also cover description of related radio-frequency, microwave	e and mm-wave cir	rcuits and
B2B31EO1	sees include practical calculations of wireless systems, computer analysis and synthesis of important structures and circuits, and rela		asurements.
The course introdu	LICENTING CITEMEST ces basic circuits with operational amplifiers, continues with the description of linear systems, analysis of their characteristics and funda	ا کر جرمہ mentals of synthes	is frequency
filters. It deals with	the principles and features of circuits for generating signals and a controlled oscillator including the PLL circuit and its use. The last p	part of the course is	s devoted to
1	pasic amplituer stages with transistors		

B2B31EQ2 Electronic Circuits	2 7.7K	4
The course builds on the basic electric circuits course. It introduces multistage transistor amplifie	rs and basic applications in the field of electronic systems. Students becon	ne familiar
with design and measurement of electronic systems, including nonlinear applications with rega	rd to the real characteristics of operational amplifiers. Next operating princi	iples and
parameters of power amplifiers, linear stabilizers, switching pow	er supply and D/A and A/D converters are presents.	
B2B317EOA Eundamentals of Electric	Circuits 7.7K	5
The course describes the basic methods of analysis of electrical circuits. In the lectures, studen	ts are introduced to the basic active and passive circuit elements, circuit or	uantities
important circuit theorems and methods of circuit analysis in stationary and harmonic steady state	as well as during transients caused by changes in the circuit. The seminars	are aimed
at practicing knowledge in the analysis of basic electrical circuits, su	upplemented by simulations and simple measurements.	
B2B3/MIK Microcontrollers	7 7K	1
The goal of this course is to make students acquainted with recent interesting applications, small	rt sensors circuits and peripherals bandled by microcontrollers. In a lab stu	r Idents will
program their own applications and measure actual properties. Because of usage of a program	iming language C it will be possible to focus on the practical part of the rea	alization
B2B37SAS Signals and system		5
DZD07 0A0 Olympical and System	s in time and frequency domains. The course also introduces the basic char	J
of handpass signals and system	ions and random signals	100101101100
		5
DZD30EWDA Electrical quantities (voltage, current, power, frequency, resistance)	$z_{\rm L}$	J oir corroct
application and accuracy estimation. The course is closed by presenting information on several h	capacitatice, and inductatice) are explained together with principles of the	
application and accuracy estimation. The course is closed by presenting information on several c	erning measurement systems	magnetic
		7
B3B02F 11A Physics of the Feelwheet Fleetricel Feelwards. Device 1 is devoted to the i	$ $ $\angle, \angle$ $\land$	/
The basic course of physics at the Faculty of Electrical Engineering - Physics 1, is devoted to the i	ntroduction into two important areas of physics. The first one is a classical r	mechanics
and the second one is the electric and magnetic ried. Within the framework of the classical mechan	nics, the students study the particle kinematics, dynamics of the mass partic	cie, system
of mass particles and rigid bodies. The students should be able to solve basic problems dealing	with the description of mechanical systems, which they can meet during the	
in this course in the study of electrical circuite theory of electrotechnical meterials or radicelectro	eige Apart of this the knowledge geined in this source is required for the a	tudy of the
In this course in the study of electrical circuits, theory of electrotechnical materials of factoelectro	nics. Apart of this, the knowledge gamed in this course is required for the s	
		0
B3B02FY2 Physics 2	<b>Ζ,Ζ</b> Κ	6
The course Physics 2 is closely linked with the course Physics 1. Within the framework of this course the second	Jrse the students will first of all learn foundations of thermodynamics. Follo	wing topic
- the theory of waves - will give to the students basic insight into the properties of waves and will	nelp to the students to understand that the presented description of the wa	aves has a
universal character in spite of the waves character. Particular types of waves, such as acoustic	or optical waves are the subjects of the following section. Quantum mecha	inics and
nuclear physics will complete the student /s general education in physics. The knowledge gaine	a in this course will help to the students in study of such modern areas as	rodotics,
Computer vision, measuring technique and will allow them to understand the princ	iples of hover technologies and functioning of new electronic devices.	-
B3B33ALP Algorithms and Program	nming   Z,ZK	6
This subject will give students a basic understanding of algorithms and programming and teach	them to design, implement and test algorithms for simple tasks. The studi	ents will
understand the notion of computational complexity. They will learn about basic program building	blocks such as loops, conditional statements, variables, functions and recu	ursion. we
will introduce the most often used data structures (queue, stack, list, array etc) and operations	on them. We will show the basic algorithms, for example for searching and	i sorting.
B3B33KUI Cybernetics and Artificial In	itelligence Z,ZK	6
The course introduces the students into the field of artificial intelligence and gives the necessary	basis for designing machine control algorithms. It advances the knowledg	e of state
space search algorithms by including uncertainty in state transition. Students are introduced into	reinforcement learning for solving problems when the state transitions are	unknown,
which also connects the artificial intelligence and cybernetics fields. Bayesian decision task introd	duces supervised learning. Learning from data is demonstrated on a linear	r classifier.
Students practice the algoritms	in computer labs.	
B3B33LAR Laboratory of roboti	cs KZ	4
During this laboratory courses the students are introduced with the practical robotics through solv	ing of practical tasks. Students are working in laboratories in groups which	n consist of
3 or 4 members. During the semester, each group of students jointly solve one practical probl	em in the field of robotics. Tasks are designed to introduce students with ro	obotics
(manipulators and mobile robots). The students should utilize the basic knowledge obtained in pre	evious study (eg. mathematics, physics, electronics, software development)	). Students
can select specific task from few tasks with different specialization, which are announced each sen	nester. Tasks differs between semesters. An integral part of the solution of the	he problem
is cooperation and communication	in the student team.	
B3B33ROB Robotics	Z,ZK	5
The course is an introduction into industrial robotics with the emphasis on the industrial robots an	d manipulators. The robot kinematics is thoroughly studied. The student sh	nall be able
to choose, design, and program industrial robot and integrat	e it into the robotic cell after passing the course.	
B3B38LPE Laboratories of Industrial Electron	ics and Sensors KZ	4
The objective of the "Laboratories" is to introduce students in a playful and interactive way with	basic blocks of an industrial sensor system - from the sensor itself, throug	gh signal
processing circuits, analog to digital signal conversion, software processing by a microcontroller up	to the sending of the results to the superior system or database and their pr	resentation
to the user within the concept "	Internet of Things".	
B4B01NUM Numerical Analysi	s Z,ZK	6
The course introduces to basic numerical methods of interpolation and approximation of functio	ns, numerical differentiation and integration, solution of transcendent equa	tions and
systems of linear equations. Emphasis is put on estimation of errors, practical skills with the m	ethods and demonstration of their properties using Maple and computer gr	raphics.
B4B33ALG Algorithms	Z,ZK	6
In the course, the algorithms development is constructed with minimum dependency to programm	ning language; nevertheless the lectures and seminars are based on Java.	Basic data
types a data structures, basic algorithms, recursive functions, abstract data types, stack, queue	s, trees, searching, sorting, special application algorithms, Dynamic progra	amming.
Students are able to design and construct non-trivial a	algorithms and to evaluate their effectivity.	
B4B33RPZ Recognition and Machine	Learning Z.ZK	6
The basic formulations of the statistical decision problem are presented. The necessary knowled	ge about the (statistical) relationship between observations and classes of	objects is
acquired by learning on the raining set. The course covers both well-established and advanced of	lassifier learning methods, as Perceptron, AdaBoost, Support Vector Mach	nines, and
Neural Nets. This course is also part of the inter-university programme prg.ai Minor. It pools the	best of AI education in Prague to provide students with a deeper and broad	der insight
into the field of artificial intelligence. More information	tion is available at https://prg.ai/minor.	0
B4B367UI Introduction to Artificial Int	elligence 77K	6
The aim of the course is to cover the basics of symbolic artificial intelligence. We will focus on alo	orithms of informed and uninformed state space search problem represer	ntation and
solving, representation of knowledge using formal logic, methods of automated reasoning and	an introduction to Markov decision making, and to two-plaver games This	course is
also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Pra	ique to provide students with a deeper and broader insight into the field of	artificial
intelligence. More information is availa	ble at https://prg.ai/minor.	
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B4B38NVS	Embedded Systems Design	Z,ZK	6
D4M22D70	The course deals with design of embedded systems using ARM based microcontrollers.	7 71/	e
B4IVI33DZO	DIGITAL IMAGE	Z,ZR	0 difficult to
implement. Seem	ingly abstract concepts from mathematical analysis, probability theory, or optimization come to life through visually engaging applicat	ions. The course f	ocuses on
fundamental princip	bles (signal sampling and reconstruction, monadic operations, histogram, Fourier transform, convolution, linear and non-linear filtering	g) and more advar	nced editing
techniques, includ	ing image stitching, deformation, registration, and segmentation. Students will practice the selected topics through six implementatio	n tasks, which will	help them
	learn the theoretical knowledge from the lectures and use it to solve practical problems		
BAB02BFY	Biophysics	Z,ZK	4
The course is focu	sed on physical processes associated with blood flow and blood gas exchange, including description of events on biological membra	ines. Further, the p	ossibilities
of measuring adva	nced hemodynamic parameters of the bloodstream are discussed. A large space is devoted to the problems of hemodialysis and per	itoneal dialysis. In	the second
part of the semest	er students are acquainted with the properties of human tissue and body fluids, including methods of their measurement. This knowle	edge is compleme	nted by the
basics of optics an	d acoustics, always in relation to biological systems. Part of the course are laboratory exercises in a modern laboratory, which suitabl	ly complement the	theoretical
	Chemistry for Disensingering	7 71/	2
Students will lea	CHEMISLY IOL DIOCHQUICECHING	Z,ZN	S S During
laboratory exercis	in the basic areas of applied chemistry in biomedical engineering and technology. At the same time, this course will introduce other to see, students should acquire basic laboratory techniques used in chemical laboratories focused primarily on the analysis of substance	es and materials	aboratory
	exercises are preceded by exercises focused on practical calculations for laboratory practice.		aboratory
BAB17EMP	Electromagnetic Field	7 7K	5
	This course gets its students acquinted with principles and applied electromagnetic field theory basics.	_,	Ū
BAB31AF1	Fundamentals of Anatomy and Physiology I	KZ	4
This theoretical	and practical course introduces students to professional anatomical terminology while providing them with basic knowledge of huma	n anatomy and ph	ysiology.
BAB31AF2	Fundamentals of Anatomy and Physiology II	Z.ZK	4
The course introd	luces the functions of the individual organ systems of the human body under resting and stress conditions. Special attention is paid to	o transport system	is and the
	regulation of homeostasis. The basic possibilities of examination of these systems are presented.		
BAB31GEN	Genetics	ZK	3
The subject provid	les students of technical dsciplines with basic information about genetics with an emphasis on modern genetic disciplines and knowle	edge that is closel	related to
the issue of medi	cal electronics and especially bioinformatics. The focus is on the organization and function of the human genome, including its possil	ole pathologically	significant
changes and the t	echniques used to determine them. Students will also learn basic information about clinical genetics, genetic counseling, genetic test	ting, as well as the	ir possible
ethical and legal iss	sues. The conclusion of the course also deals with original and modern approaches enabling targeted editing of the genome, especia	lly the so-called ge	ene therapy.
Although the major	ty of the curriculum is oriented towards the numan organism, knowledge about the genetics of other living systems - especially prova	aryotes and viruse	s - is part of
	Introduction to biographocring	K7	1
BABSTOBI	The course presents the basics of biomedical engineering and provides illustrative examples of projects performed by the faculty	teams	4
BAB3177S	Basic Signal Processing	K7	4
An introductory cou	rse on digital signal processing (DSP). The course introduces the basic digital signals theory with an emphasis on practical applicatio	ns and analysis of	real signals
in time. Exercises	are built for progressive mastery of the MATLAB programming environment, which provides a friendly and easy-to-use user environment	nent with graphical	and audio
	output. You will apply the acquired knowledge in other courses, projects, theses, and especially in broader engineering and biomedic	al practice.	
BAB34BMS	Biomedical sensors	Z,ZK	4
Sensors and micro	sensors used in biomedicine. Physical principles of operation of sensors and microsensors for sensing: temperature, pressure, defor	mation, vibration,	mechanical
quantities, magnetic	c field, flow, chemical and biochemical quantities, etc. Classification, parameters. Processing of sensor signals, application of sensors in	biomedicine. Nand	otechnology.
	Sensors and microsystems for biomedical diagnostics (Lab-on-chip, etc.).		
BAB34BSP	Biomedical Sensors Practically	KZ	4
The aim of the cour	se is to gain experience with design, implementation and testing of practical constructions with sensors for biomedical applications a	nd with regard to t	he needs of
	Students of FEE who will realize the practical final work.	7 71/	_
BAB34MINS		Z,ZK	4 tara usabla
in biomedicine mic	course are knowledge of new principles of operation of components and systems with micro-dimensions, microsystems, microsenso	rious physical and	hiochemical
principles and qua	intities using mainly MEMS technology. Physical principles of operation of microsystems and microactuators, classification, paramete	rs. design. integra	tion. signal
processing, lineariz	ation, calibration, system intelligence, applications of microactuators (electrostatic, piezoelectric, thermal, chemical and biochemical, op	tical,). The course	e introduces
modern solutions in	n biomedicine, action elements in conjunction with sensors, whose operation is based on basic physical and biochemical principles, i	ncluding basic app	olications in
	micromanipulation, microrobots. The course presents the principles of touch screens, energy microgenerators.		
BAB36PRGA	Programming in C	Z,ZK	6
The course targets	to gain a deep, comprehensive knowledge of the C programming language in terms of program operation, access and memory mana	gement, and the c	evelopment
of multi-threaded	applications. The course emphasizes acquiring programming habits for creating readable and reusable programs. Students get acqua	ainted with the con	pilation of
the source codes ar	no their debugging. Lectures are based on the presentation of basic software constructs and demonstration of motivational programs wi	tn practical constru	icts pointing
to the readability	and sinucture of source code, real computational complexity, and related tools for profiling and debugging. Students get acquainted v	viul the principles	u parallel
Programming of Mu 	C ++ extension are briefly presented	icatures of the ODJ	COL-OHEIHEU
BAB37APO	Annlied Ontics	7 7K	4
BAR377DD	Programming Recentials	7.74	<del>ب</del> ۵
BRAD20	Bachalor thesis	7	20
BBPRO 14	Rachalor Project	7	1
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