### Study plan

### Name of study plan: Biomedical Technology

Faculty/Institute/Others: Department: Branch of study guaranteed by the department: Welcome page Garantor of the study branch: Program of study: Biomedical Technology Type of study: Bachelor full-time Required credits: 180 Elective courses credits: 0 Sum of credits in the plan: 180 Note on the plan:

Name of the block: Compulsory courses Minimal number of credits of the block: 170 The role of the block: Z

Code of the group: F7ABB POV 20 Name of the group: Biomedical Technology compulsory course Requirement credits in the group: In this group you have to gain 170 credits Requirement courses in the group: In this group you have to complete 56 courses Credits in the group: 170 Note on the group:

Note on the gr						
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members)	Completion	Credits	Scope	Semester	Role
	Tutors, <b>authors</b> and guarantors (gar.)					
F7ABBALP	Algorithmic and Programming Theory Lenka Hanáková, Pavel Smr ka, Tomáš Veselý, Christiane Malá Pavel Smr ka Pavel Smr ka (Gar.)	КZ	4	2P+2C	z	Z
F7ABBAF1	Anatomy and Physiology I. Anastasiya Lahutsina, Ksenia Sedova Ksenia Sedova (Gar.)	Z,ZK	4	2P+1C+1L	Z	Z
F7ABBAF2	Anatomy and Physiology II. Anastasiya Lahutsina, Ksenia Sedova, Anastasia Sedova Anastasiya Lahutsina Ksenia Sedova (Gar.)	Z,ZK	4	2P+1C+1L	. L	Z
F7ABBA3A	English Language IIIA (part 1) Eva Moty ková Eva Moty ková Eva Moty ková (Gar.)	ΚZ	2	2C	Z	Z
F7ABBA3B	English Language IIIB (part 2) Eva Moty ková Eva Moty ková Eva Moty ková (Gar.)	KZ	2	2C	L	Z
F7ABBBP	Bachelor Thesis Ji í Hozman <b>Ji í Hozman</b> Ji í Hozman (Gar.)	Z	6	8C	L	Z
17ABOZP	Occupational Safety and Health, Fire Protection and First Aid Petr Kudrna Petr Kudrna (Gar.)	Z	0	1P	Z	Z
F7ABBBCH	<b>Biochemistry</b> Martina Turchichová, Anna Ludvíková <b>Martina Turchichová</b> Martina Turchichová (Gar.)	Z,ZK	2	1P+1L	z	Z
F7ABBBLS	Biological Signals Václava Piorecká, Marek Piorecký Václava Piorecká Václava Piorecká (Gar.)	Z,ZK	4	2P+2L	L	Z
F7ABBBLG	Biology Veronika Vym talová Veronika Vym talová Veronika Vym talová (Gar.)	Z,ZK	4	2P+2L	Z	Z
F7ABBBB	Biomechanics and Biomaterials Matej Daniel, Petr Volf Petr Volf Matej Daniel (Gar.)	Z,ZK	4	2P+2L	Z	Z
F7ABBBOZP	Safety Regulations and Standards in Electrical Engineering Petr Kudrna Petr Kudrna (Gar.)	Z	1	1P	Z	Z
F7ABBCHM	Chemistry Iveta Horá ková, Libor Holík Iveta Horá ková	Z,ZK	4	2P+1C+1L	. L	Z
F7ABBEM	Electrical Measurements Jan Vrba, Roman Mat jka Jan Vrba Jan Vrba (Gar.)	Z,ZK	4	2P+2C	Z	Z
F7ABBELF	Electrophysiology Ksenia Sedova, Anastasia Sedova Anastasia Sedova (Sar.)	Z,ZK	2	1P+1L	Z	Z
F7ABBEO	Electronic Circuits Pavel Máša, Tomáš D íž al, Ond ej Fišer <b>Ond ej Fišer</b> Pavel Máša (Gar.)	Z,ZK	4	2P+2C	Z	Z

F7ABBEBI	Ethics in Biomedical Engineering	ZK	2	2P	L	z
F7ABBESP	Václav Navrátil Václav Navrátil Martina Dingová Šliková (Gar.) Management of Health Care Technology	Z,ZK	2	1P+1C	L	z
F7ABBFY1	Ji í Hozman <b>Ji í Hozman</b> Ji í Hozman (Gar.) Physics I.	Z,ZK	4	2P+1C+1L	Z	z
F7ABBFY2	Jan Mikšovský, Petr Písa ík <b>Petr Písa ík</b> Jan Mikšovský (Gar.) Physics II.	Z,ZK	6	2P+2C+2L	L	z
	Jan Mikšovský Petr Písa ík Jan Mikšovský (Gar.) Physical Chemistry		-			
F7ABBFCH	Libor Holík, Karel Roubík Karel Roubík Karel Roubík (Gar.) Hygiene and Epidemiology	Z,ZK	4	2P+1C+1L	Z	Z
F7ABBHE	Anastasia Sedova Anastasia Sedova Emil Pavlík (Gar.)	ZK	1	1P	L	Z
F7ABBISZ	Information Systems in Health Care Zoltán Szabó, David Jirsa Zoltán Szabó Zoltán Szabó (Gar.)	Z,ZK	4	2P+2C	Z	Z
F7ABBITP	Integral Calculus Ji í Neustupa, Tomáš Parkman, Lukáš Liebzeit Tomáš Parkman Tomáš Parkman (Gar.)	Z,ZK	4	2P+2C	L	z
F7ABBKT	<b>Communication Technology</b> Christiane Malá, Martin Vít zník, Karel Hána, Jan Mužík, Tomáš Funda <b>Karel</b> Hána Karel Hána (Gar.)	Z,ZK	2	1P+1C	Z	z
F7ABBKZS	<b>Conventional Imaging Systems</b> Ji í Hozman, Tomáš D íž al, Martin Rožánek, Martin apek <b>Ji í Hozman</b> Ji í Hozman (Gar.)	Z,ZK	4	2P+1C+1L	L	z
F7ABBLT	Clinical Laboratory Instrumentation Martina Turchichová Martina Turchichová Martina Turchichová (Gar.)	Z,ZK	4	2P+2L	L	z
F7ABBLPZ1	Medical Devices and Equipment I. (Diagnostic Devices) Petr Kudrna, Karel Roubík, Martin Rožánek Petr Kudrna Martin Rožánek (Gar.)	Z,ZK	4	2P+2L	Z	z
F7ABBLPZ2	Medical Devices and Equipment II. (Therapeutical Devices) Petr Kudrna, Václav Ort, Ladislav Bís Petr Kudrna Petr Kudrna (Gar.)	Z,ZK	2	1P+1L	L	z
F7ABBLAD	Linear Algebra and Differential Calculus Ji í Neustupa, Tomáš Parkman, Petr Maršálek <b>Ji í Neustupa</b> Tomáš Parkman (Gar.)	Z,ZK	6	2P+4C	Z	z
F7ABBMAZ	Management and Admininistration in Health Care Václav Navrátil Václav Navrátil Václav Navrátil (Gar.)	KZ	1	1P	Z	Z
F7ABBMEC	Mechanics	Z,ZK	4	2P+2L	L	z
F7ABBMT	Matej Daniel, Tomáš Goldmann <b>Matej Daniel</b> Matej Daniel (Gar.) Medical Terminology Václav Navrátil Václav Navrátil Václav Navrátil (Gar.)	Z	1	1C	Z	z
F7ABBMVP	Research Methodology	KZ	2	1P+1C	Z	Z
F7ABBMS	Marek Novák, Jakub Ráfl Jakub Ráfl Jakub Ráfl (Gar.) Modelling and Simulation	Z,ZK	4	2P+2C	L	Z
F7ABBNMP	Václav Petrák Václav Petrák Václav Petrák (Gar.) Project Proposal and Management	KZ	2	1P+1C	L	z
F7ABBOIZ	Václav Bláha Václav Bláha Václav Bláha (Gar.) Protection Against Ionizing Radiation	ZK	2	2P	L	z
	Tomáš Veselský Tomáš Veselský Jana Hudzietzová (Gar.)           Patient and Device Simulators and Testers			(5.4)	_	
F7ABBPPS	Petr Kudrna, Martin Rožánek, Lenka Horáková <b>Petr Kudrna</b> Petr Kudrna (Gar.)	Z,ZK	2	1P+1L	Z	Z
F7ABBPPM1	Programming in Matlab I. Christiane Malá Radim Krupi ka Christiane Malá (Gar.)	KZ	1	1C	Z	z
F7ABBPPM2	Programming in Matlab II. Christiane Malá Radim Krupi ka Radim Krupi ka (Gar.)	KZ	2	2C	L	z
F7ABBPNK	Design and Construction of Medical Devices/Practical Exercises Roman Mat jka, Jana Mat jková Jana Mat jková Roman Mat jka (Gar.)	KZ	4	4L	Z	z
F7ABBPMS	Probability and Mathematical Statistics Marek Piorecký, Jan Štrobl, Michaela Mrázková, Filip erný Michaela Mrázková Marek Piorecký (Gar.)	Z,ZK	4	2P+2C	Z	z
F7ABBPP	First Aid Martin Stan k Martin Stan k Martin Stan k (Gar.)	KZ	2	1P+1C	L	z
F7ABBPSL	Psychology Olga Shivairová Olga Shivairová Olga Shivairová (Gar.)	KZ	2	1P+1C	Z	Z
F7ABBROP	Oliga Sinvanova Oliga Sinvanova Oliga Sinvanova (Gal.)           Guided Practical Training           Petr Kudrna Petr Kudrna Petr Kudrna (Gar.)	Z	2	80XH	L	z
F7ABBSPR1	Semestral Project I. Petr Kudrna Petr Kudrna Petr Kudrna (Gar.)	KZ	1	1C	L	z
F7ABBSPR2	Semestral Project II.	KZ	4	4C	Z	z
F7ABBSBP	Petr Kudrna Petr Kudrna Petr Kudrna (Gar.) Bachelor Thesis Seminar	Z	1	1C	L	Z
	Ji í Hozman <b>Ji í Hozman</b> Ji í Hozman (Gar.) Sensors in Medicine	Z,ZK	4	2P+2L	L	z
F7ABBSM	David Vrba, Tomáš Pokorný, Jan Rédr <b>David Vrba</b> David Vrba (Gar.)	, -				1

F7ABBSPT	Equipment for Anaesthesiology and Resuscitation Karel Roubík, Václav Ort, Jakub Ráfl, Simon Walzel Jakub Ráfl Václav Ort (Gar.)	Z,ZK	4	2P+2L	L	z
F7ABBTEL	Pavel Máša, Tomáš D íž al, Marek Novák <b>Tomáš D íž al</b> Pavel Máša (Gar.)	Z,ZK	4	2P+2C	L	z
F7ABBTZS	Tomographical Imaging Systems Ji í Hozman, Tomáš D íž al, Martin Rožánek, Evgenila Karnoub Martin Rožánek Ji í Hozman (Gar.)	Z,ZK	4	2P+1C+1L	Z	Z
F7ABBUSS	Introduction to Signals and Systems Jan Kauler Jan Kauler Jan Kauler (Gar.)	Z,ZK	4	2P+2C	Z	Z
F7ABBZP	Fundamentals of Pathology Richard Becke Richard Becke Richard Becke (Gar.)	ZK	2	2P	L	z
F7ABBZLN	Legislation in Health Care and Technical Standards Vojt ch Kamenský, Peter Kneppo Vojt ch Kamenský Peter Kneppo (Gar.)	KZ	2	1P+1C	Z	z
Characteristics of t	the courses of this group of Study Plan: Code=F7ABB POV 20 Nar	me=Biomed	ical Tech	nology c	ompulso	ry course
F7ABBALP	Algorithmic and Programming Theory				KZ	4
-	b. Identifiers, data types. assignment statement, conditional statement, cycles. Arithmetical au structured programming in C language - building and structure of simple programs, creating		-	-		
-	ractical overview of programming techniques and basic algorithms in C language. Recursive	-				-
	earching, implementation of basic numerical algorithms. Introduction to biomedical data pro					
	Anatomy and Physiology I.			Z	,ZK	4
	I covers functional aspects of particular organs and their systems.				714	
	Anatomy and Physiology II. II links to Anatomy and Physiology I. The subject covers functional aspects of particular or	gans and their s	vstems.	2	,ZK	4
	English Language IIIA (part 1)	<u>.</u>			κz	2
	to increase students' language competence in academic English and professional vocabula					
-	academic text, understand and be able to use basic terminology and be aware of the diffe	erent stylistic leve	els of Englis	h and the as	sociated syr	ntactic and
lexical devices.	English Language IIIB (part 2)				κz	2
	summer semester are project-based.			I		2
F7ABBBP	Bachelor Thesis				Z	6
	s at the end of bachelor studies. Topics are selected during the 5th term from a list. Bachelo					
	the state exam. Bachelor thesis can be written and defended either Czech or English. Stud	ents are supervis	sed by a tuto	or during the		-
	Occupational Safety and Health, Fire Protection and First Aid			7	Z ,ZK	0
	Biochemistry ie introduced to the basics of Biochemistry. The course builds on the knowledge gained in g	general chemistr	v and exten		· I	_
	erpretation goes through the basic building structures of biological systems (amino acids, p	-	-		-	-
	ar genetics to the most important metabolic processes. Particular attention is paid to the as			0		
	aboratory, which are part of the follow-up chemical discipline. The laboratories are focused o e determination of biomolecules and the verification of their properties. Students should be	-	-			
	Biological Signals				,ZK	4
-	igins and description of the most important electric and non-electric biological signals. The	principles of gen	eration, reco		Ý I	
in all the signals. The stud	died signals involve native and evoked biosignals, including biological signals of the heart,	brain, muscles, i	nervous sys	tem, auditor	/ signals, vi	sual system,
	testinal system etc. Advanced methods of digital biosignal processing, spectrum analysis, mo	odern methods of	f artificial inte	elligence, fea	tures extrac	tion, automatic
	esentation of results. Adaptive segmentation, artificial neural networks for signal procesing. Biology			7	,ZK	4
	he cellular level of organisms - from acelullar through prokaryotic to eukaryotic. The viruse:	s. Prokaryotic ce	ells. Bacteria		·	-
Eukaryotic cells. Plant an	d animal cell structure and function. Structure and conformation of biopolymers (nucleid ac	cids and proteins	s). The nucle	eus, plastids,	mitochondr	ia. Cytoplasm.
	endoplasmic reticulum, the Golgi apparatus, lysosomes, vacuoles. Semiautonomic organe			•		
	n of eukaryotes: endosymbiotic hypothesis. Ribosomes. The cytoskeleton: microtubules, mi vision of cell nucleus - amitosis, mitosis, phases of mitosis, the mitotic spindle; meiosis. The			. , ,		
. ,	and modern genetics: structure, function and inheritance of genes. Includes the chemistry an					
	Human genetics. Chromosomal aberrations, genetic disorders and diseases. Genetic engi	ineering. GMO o	rganisms.			
	Biomechanics and Biomaterials			1	,ZK	4
	or all students who need to supplement their knowledge and have a general knowledge abore be sufficient to understand athe issues in related subjects, especially the subject of Mecha				•	
	d the opportunity to complete these basic knowledge, they will be exposed to the risk of mis					
this is not taken into acco	-					
	Safety Regulations and Standards in Electrical Engineering				Z	1
	training and examinations from the sections of the regulation No. 50/1978 Coll. and instruct ning electrical shock injury. Symbols and labeling in electrotechnology - safety colors import	-				
	safety tables, graphical signs on the electrical devices, letter conductor labeling, AC nomin				-	-
	on, safety of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical devices - safety classes, periodical inspection and check of the electrical devices - safety classes, periodical devices - safe					
	onship of the law and safety regulations. Risk analysis in the field of electrotechnology. Spe	cial qualification	in electrote	chnology - re	gulation No	. 50/1978 Coll.
	ctrotechnology qualification and directive "B". Lasers safety regulations.			7	,ZK	4
	categorization and properties of substances, chemical bonds, chemical reactions, elemen	nts in periodic tat	ole, organic			
-	nalytical methods - instrumental analysis, chemical calculations, chemical equations					
F7ABBEM	Electrical Measurements			Z	,ZK	4
-	ues, principles, using, and parameters. Analogue measuring converters. Electromechanical	-		-		
	g. Electric work and electric power measuring: direct current, single-phase and three-phase ope. Digitalization, digital signal processing, signal reconstruction. Electronic measuring dev			-		
			,			

F7ABBELF	Electrophysiology	Z,ZK	2
-	duce students to the theory of electrical phenomena at the cell, organ and organism level, to the possibilities of measuring ar	-	
	ble students to experimentally verify the knowledge. This course builds on Anatomy and Physiology I and II and requires a ba	-	
	(physiology) of the following systems (excitable tissues): nervous, musculoskeletal, circulatory (especially the heart). The co		•
	bus, The course deals with the physiology of nervous tissue, muscle and glandular tissue and provides knowledge of the physiology of nervous tissue, and provides knowledge of the physiology of	sology of electrica	al processes at
different levels: cell, tiss		7 74	4
	Electronic Circuits basic orientation in the principles of electronic circuits used in electronic laboratory and medical devices. It provides a prereq	Z,ZK	4 d operation of
	strumentation, technology. Course entry requirements: Successful completion of Theoretical Electrical Engineering. Exit Know		-
	ts will become familiar with functional electronic blocks that are used in the design of laboratory and medical instruments. The		
	e basic properties and parameters of electronic devices.		
F7ABBEBI	Ethics in Biomedical Engineering	ZK	2
	hical concepts and theories in the context of applied ethics with respect to the professional orientation, maintenance, and develo	1 1	
	equisites and co-requisites: Knowledge of humanities in the scope of secondary school studies (basics of philosophy, history,	-	-
skills, abilities, and con	npetencies: Knowledge of basic concepts and controversial topics in theoretical and applied ethics, the ability to critically think	k, discuss, argue a	and defend their
own views in ethical dil	emma situations, developing the ability to work with literature, enhance empathy skills.		
F7ABBESP	Management of Health Care Technology	Z,ZK	2
F7ABBFY1	Physics I.	Z,ZK	4
Course Physics 1 is use	ed to repeat and expand the basic knowledge of physics in the field of classical mechanics, thermals and optics, which is need	1 ' 1	y at FBME CTU.
Students will gain theory	retical knowledge, the ability to solve numerical problems and practical skills associated with working in laboratories.		-
F7ABBFY2	Physics II.	Z,ZK	6
	ollows the course Physics 1 and expands the acquired knowledge in the field of electromagnetism and the basics of atomic ar	1 · · · · · · · · · · · · · · · · · · ·	
matter physics.			
F7ABBFCH	Physical Chemistry	Z,ZK	4
-	properties of substances. Basic calculations. Principles and behavior of systems of gases and liquids. Chemical bonds. Properties	· · ·	Electrolytes.
-	ces. Phase equilibria, multiface systems. Behavior and properties of vapors, evaporation. Electrochemical potential, electrode		-
kind. Referent and indic	cation electrodes, electrodes for EKG, EEG, EMG etc. Redox potential. Inert electrodes. Membranes - types, properties and a	applications. Osmc	otic pressure. Ion
selective electrodes. Ad	cidity and basicity of solutions, pH. pH measurement. Stability of materials, corrosion. Passivation and self-passivation. Electro	olysis and conduct	tivity of solutions
and its measurements.	Polarography. Further methods of analysis of gases and solutions in BME (Biomedical Engineering.) Optical absorption. Spe	ctrophotometry. Fl	luorescence and
phosphorescence. Sen	sors for measuring of pH, pO2, pCO2, and SaO2 working on the basis of fibre optic cables and absorption or fluorescence. A	dvanced analytica	al devices. Mass
spectroscopy, nuclear r	nagnetic resonance, flame spectroscopy. Thermodynamics of reaction systems, basic calculations.		
F7ABBHE	Hygiene and Epidemiology	ZK	1
Students should learn t	theoretical basics of Epidemiology and Hygiene disciplines in depth covered by lecture topics. As result of this subject, studer	nt should be famili	ar with targets
-	used in all disciplines of infectious and non-infectious epidemiology, environmental epidemiology and in solving of priorities ar	-	blic Health
	knowledge, skills, abilities and competences: Knowledge of basic methods used in preventive medical disciplines and legislat	,,	
F7ABBISZ	Information Systems in Health Care	Z,ZK	4
	on medical informatics definition and basic characteristic of the different specialized areas. The relations between IS and heal		-
	d as well. Some basic information technology, HW and SW tools are described in relation to IS design. A special attention is p		-
	d communication standards. Different types and features of clinical and hospital IS, decision support systems and regional he	alth care IS are an	nalyzed and
	y of IS development, implementation and support are presented as well.		
F7ABBITP	Integral Calculus	Z,ZK	4
	luction to integral calculus and integral transforms. Integral calculus: anti-derivative, indefinite integral, properties and methods		
	rtial fractions), definite integral, properties, Newton-Leibnitz fundamental theorem, simple applications of both indefinite and d ations (ODEs) (1st order ODEs with separable variables, linear 1st order homogenous as well as non-homogenous ODEs, 2r	-	
	s with constant coefficients), intro to multiple integrals, particularly double integral and applications. Integral transforms: Lapla		
•	s with constant coefficients, into to matiple integrals, particularly double integral and applications. Integral transforms, Lapla lication for solving nth order linear ODEs with constant coefficients.		inverse Laplace
F7ABBKT	Communication Technology	Z,ZK	2
	s to teach the student to understand the basic principles of the function of personal computers, their peripherals and communi	1 1	
	k interface and configure and connect a peripheral type of a standard medical devices equipped with a wired or wireless inte		They will be able
F7ABBKZS	Conventional Imaging Systems	Z,ZK	4
	on spectrum and relationship to the modalities of medical diagnostic imaging systems. Fundamentals of imaging theory. Appl	1 · · · · · · · · · · · · · · · · · · ·	
-	vstems. Optical imaging systems including microscopic. Television imaging systems (including video endoscopic imaging systems)		
	Is. Infrared imaging systems (thermal imaging/IR imaging systems). X-ray imaging systems. Gamma imaging systems. Lectur	, 0	0
	ents with an overview of the principles of image formation in medicine for conventional imaging systems and methods. There		
	on and subsequent processing and principles of function and properties of sensing image devices in context, which is especially		-
point of view of the who	ble course and study specialization. Knowledge, skills and competences: The student is able to explain the basic physical prir	ciple of the given	modalities and
knows its layout includi	ng the principle of image formation. The student is able to assess, on the basis of standard definition of technical parameters	that imaging system	em meets the
physician requirements	s for selected modality. Such knowledge is a prerequisite to the correct process technology selection and application of the mo	odalities as well as	s the minimum
necessary to ensure th	e required quality of the resulting image data.		
F7ABBLT	Clinical Laboratory Instrumentation	Z,ZK	4
-	umentation introduces principles of bioanalytical methods used in clinical diagnostics. Emphasis is put on optical methods (U		
	S, fluorimetry), NMR and X-ray analysis, electrochemical and electromigration methods (ion electrodes, biosensors, electrop		
	tic methods (ELISA, PCR) as well as on chromatography and mass spectrometry. Contribution of lab automation to clinical d	agnostics will be a	also discussed.
	course students will be introduced into the basics of work in bioanalytical laboratory and lab data processing.	<b></b>	
F7ABBLPZ1	Medical Devices and Equipment I. (Diagnostic Devices)	Z,ZK	4
-	pries. Electrical safety of medical devices. Biopotentials amplifiers. Electrocardiographs, electromyographs and electroenceph		
	output measurement. Blood pressure measurement. Cardiac frequency measurement. Phonocardiography. Pulse oximetry. M	edical monitors. E	ectrostimulation
	dical devices. Therapeutic medical devices. Implantable medical devices. Telemetry. Medical devices for audiology.		-
F7ABBLPZ2	Medical Devices and Equipment II. (Therapeutical Devices)	Z,ZK	2
-	pries. The electrical safety of therapeutical medical devices. Artificial ventilation, introduction. Conventional ventilation. High-free		-
	<ul> <li>h. Hemodialysis. Drug infusion pumps (volumetric, syringe). Artificial cardiac pacemaker. Defibrillators (external, implantable).</li> </ul>	Cocniear implant.	∟lectrosurgery
units. Therapeutic ultra	sound. Electro-therapy. Magneto-therapy.		

F7ABBLAD Linear Algebra and Differential Calculus	Z,ZK	6
The course is introduction to differential calculus and linear algebra. Differential calculus - sets of numbers, sequences of real numbers, real function	is (function proper	ties, limits,
continuity and derivative of a function investigation of function behavior), Taylor's formula, real number series. Linear algebra - vector spaces, matrice	es and determinar	nts, systems of
linear algebraic equations (solvability and solution), eigenvalues and eigenvectors of matrices, applications.		
F7ABBMAZ Management and Admininistration in Health Care	KZ	1
Getting to know the structure of the health sector and financing models Health. Zoom administrative management issues various types of medical w	orkplaces, their ne	ecessary
interconnection. Orientation in the specific features of health facilities and European systems of health care workplaces.		
F7ABBMEC Mechanics	Z,ZK	4
Students will get acquainted with the following areas of mechanics: General physical equations, Newton's laws, statics and dynamics. Force and mo		-
replacement. Equilibrium of a force system in a plane and space - equation of equilibrium, systems into equilibrium. Reactions on statically determin	,	
spatial and planar constraints, solution of reactions. Static moment, center of gravity and center of area. Spatial moment of inertia - kinetic energy of re momentum, law of conservation of momentum. Second moment of area - product moment, polar moment, Mohr circle, main moments of inertia, ellip	-	
- beam, system of plates, course of internal static effects, kinematic method, statically indeterminate problems. Mechanical properties of materials -		
stresses and deformations, Hooke's law. Stress and strain - uniaxial and biaxial stress state, simple bending, bending curve, torsional stress, cross-s		
cross-sections, combined stress, nonlinear models. Buckling strength - critical load, stability of members, calculation of cross section. Tests of hardness,		
F7ABBMT Medical Terminology	Z	1
Attendants are made acquainted with particular terms flowing from latin but also greek expressions during their lectures. Students are continuously i	nformed about ter	ms of whole
diagnosis and therapeutical procedures. Education is combined with continuous knowlegde check up through the use of tests.		
F7ABBMVP Research Methodology	KZ	2
The course introduces students to the basic methods of research work and the requirements for scientific communication. The course also introduce	s students to the	principles of
writing and presenting of bachelor's thesis.		
F7ABBMS Modelling and Simulation	Z,ZK	4
Basic concepts. Aims and consequences of modeling and simulation. The methodology of modeling and simulation. Inverse problem. Proposal for a	new, respectively.	additional
experiment. Compartmental models. Physiological models. Pharmacokinetics. Continuous and discrete models of population dynamics. Epidemiolog	ical models. Vene	ral disease
models.		
F7ABBNMP Project Proposal and Management	KZ	2
As part of the lectures, students will become familiar with topics such as project management (PM) according to IPMA, the certification process, pro		-
and the project life cycle, as well as project initiation. They will learn about the feasibility study, project initiation, project identification document, and	-	-
include an introduction to project planning, scheduling, risk and risk analysis, project implementation, behavioral competencies in PM, project closur		
also gain practical insights from a hospital environment. During the exercises, students will master the following concepts and topics and develop rele study, identification document, logical framework, WBS (Work Breakdown Structure a hierarchical structure of tasks or activities), scheduling, risk and	-	-
a final test. As part of this course, students have the opportunity to obtain the IPMA Level D certification, which is intended for aspiring project mana		
team members. The certification is valid for five years.	golo, projoci coon	
F7ABBOIZ Protection Against Ionizing Radiation	ZK	2
The aim of the course is to give students an overview of the issues of protection against ionizing radiation and dosimetry in general and in a speciali	I I	
will studied properties of basic types of ionizing radiation, sources of ionizing radiation, interaction of gamma radiation with matter, interaction of cha		
and electron beam passage through the matter, units used in dosimetry and radiation protection, operational units for working and environment monitor	oring, dose measu	rement, internal
and electron beam passage through the matter, units used in dosimetry and radiation protection, operational units for working and environment monitor contamination, shielding of simple sources. Special attention is paid to the exposure control of workers, residents and patients. In course students will	-	
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F7ABBPSL Psychology		KZ	2
Development, methodology and methods of psychology. Mental activities and psychic processes, psychology of personality, objects of psychology.	chology and t	heir formation a	nd development.
Modern psychology; its concept and theory, psychic processes and stages. Psychological interpretation of personality. Application of know	0		
technicians and medical doctors, technicians and patients, technicians and nurses. Communication as a tool for good cooperation amon	• • •		
expression and communication skills. Use of elocution and gestures in personal expression. Verbal and nonverbal communication. Dialog	gue; types of o	dialogue, questio	ons during
dialogue. Model situations. Communication process as part of economics - components, tools and functions.			
F7ABBROP Guided Practical Training		Z	2
Familiarization of students with the organization and provision of professional internships at the clinical workplace. Provision of contractu			
ROP (supervised professional practice). The ROP will then enable the acquired practical skills and habits to be applied in the key subject overview of the current technical level of hospital equipment; an overview of the organization of the work of biomedical technicians and experiments are constrained as a subject of the subject of t			
ensure the safe operation of medical equipment. He can communicate with technicians, but also medical staff. He is able to work in a tea	-	apply legal leq	
F7ABBSPR1 Semestral Project I.		KZ	1
The topic of the semester project (SPR1) must be in the field of biomedical engineering and must be related to the study field of the sam	e name Biom	1	
available for the relevant academic year in the database projects.fbmi.cvut.cz Note: It is not possible to implement economic-managerial			
research, clean programming, topics purely in the field of biology, etc. The application must always be part of the work in accordance wit			
be related to technology (medical devices, or the scope of work of a Biomedical Technician in clinical practice)! Entries that do not fall int	o the above a	areas will not be	approved.
F7ABBSPR2 Semestral Project II.		KZ	4
The main idea is to start work on a project which can be improved in time and finish as a Bachelor thesis. In the course will be discussed to	opic as basic (	communication a	and presentation
skills, including teamwork and project management. Creation of presentations and written texts. Typography rules. Types, purpose and re	equirements o	of technical prese	entations and
technical texts. Writing a commented bibliographic search. The student solves topic (project) from the selection of the PROJECTS datab	ase - http://pro	ojects.fbmi.cvut.	cz During the
term, there are dedicated 2 hours every week for work under teacher supervising.			
F7ABBSBP Bachelor Thesis Seminar		Z	1
Objective(s): The aim of the course is to accentuate the realized outcomes of the projects solved in the 4th, 5th and 6th semesters of the	Biomedical T	Technology Bach	elor's degree
study program. The aim of the course is also to prepare students for the defense of their bachelor thesis infront of the final state examination of the state examination o			
Prerequisite F7PBBMVP Exit Knowledge, Skills, Abilities and Competencies: Students are fully aware of the requirements for the requirement			'
they are proficient in the orientation in the professional literature. The students are able to understand the literature and literature on a gi	ven topic, app	oly scientific rese	arch methods
to specific assignments. They present their proposed solutions and results, are able to interpret the results.			
F7ABBSM Sensors in Medicine		Z,ZK	4
This subject provides information about basic electronic devices - sensors, describes their operation principle, basic circuit configuration			
clarifying of basic principles and practical utilization. Integral part of this course is basic information about sensors of non-electric quantiti			-
sensors (force, pressure, torque, vibration, displacement, acceleration etc.) magnetic field sensors, temperature sensors, chemical sensor	ors, optical ser	isors and bioser	isors. The stress
is aid on miniaturization, integration		7 71/	
F7ABBSEL Power Engineering	motoro hooio	Z,ZK	5
Basics of power electronics, power supplies, including electrochemical sources, rectifiers, stabilizers, the most commonly used types of a last including electronic and connecting applications with a feature of matricel use. Emphasics is placed primarily on the physical pattern of the the		-	
electrical systems and connecting appliances with a focus on medical use. Emphasis is placed primarily on the physical nature of the problem verified on practical examples and in the laboratory.	blem and its	understanding.	chowledge will
		774	1
F7ABBSPT Equipment for Anaesthesiology and Resuscitation		Z,ZK	4 spitals These
F7ABBSPT   Equipment for Anaesthesiology and Resuscitation The main objective of the course is to introduce students to the basic equipment of intensive care units (ICU) and anesthesiology and re		epartments of ho	spitals. These
F7ABBSPT Equipment for Anaesthesiology and Resuscitation The main objective of the course is to introduce students to the basic equipment of intensive care units (ICU) and anesthesiology and re are devices to support vital functions, especially lung ventilation, as well as patient monitors, anesthesia machines and their parts and other	ner equipment	epartments of ho t. Another object	spitals. These ve of the course
F7ABBSPT         Equipment for Anaesthesiology and Resuscitation           The main objective of the course is to introduce students to the basic equipment of intensive care units (ICU) and anesthesiology and re are devices to support vital functions, especially lung ventilation, as well as patient monitors, anesthesia machines and their parts and oth is to integrate knowledge and skills of students from the fields of science (especially physics, chemistry and physiology) and engineering	ner equipment	epartments of ho t. Another object	spitals. These ve of the course
F7ABBSPT         Equipment for Anaesthesiology and Resuscitation           The main objective of the course is to introduce students to the basic equipment of intensive care units (ICU) and anesthesiology and re are devices to support vital functions, especially lung ventilation, as well as patient monitors, anesthesia machines and their parts and oth is to integrate knowledge and skills of students from the fields of science (especially physics, chemistry and physiology) and engineering etc.) in the analysis of clinical technology and in the design and implementation of functional technical systems.	ner equipment	epartments of ho . Another objecti cuit theory, pneu	spitals. These ve of the course
F7ABBSPT         Equipment for Anaesthesiology and Resuscitation           The main objective of the course is to introduce students to the basic equipment of intensive care units (ICU) and anesthesiology and re are devices to support vital functions, especially lung ventilation, as well as patient monitors, anesthesia machines and their parts and oth is to integrate knowledge and skills of students from the fields of science (especially physics, chemistry and physiology) and engineering etc.) in the analysis of clinical technology and in the design and implementation of functional technical systems.	ner equipment (modeling, cir	epartments of ho t. Another object cuit theory, pneu Z,ZK	spitals. These ve of the course matic elements, 4
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F7ABBSPT         Equipment for Anaesthesiology and Resuscitation           The main objective of the course is to introduce students to the basic equipment of intensive care units (ICU) and anesthesiology and re are devices to support vital functions, especially lung ventilation, as well as patient monitors, anesthesia machines and their parts and ot is to integrate knowledge and skills of students from the fields of science (especially physics, chemistry and physiology) and engineering etc.) in the analysis of clinical technology and in the design and implementation of functional technical systems.           F7ABBTEL         Theory of Electrical Engineering           Electric current, DC and AC currents. Electrical curcuits including R, L, C. Power of electric requency characteristics of the L/C circuit the conductivity, creation of the semiconductor crossing, properties in the forward and reverse direction. Bipolar transistor - transistor effect transistor. Unipolar transistors with complementary vodivosti (CMOS). Electromagnetic effects (induction, magnetization, force effect). El electromagnetic compatibility. Soft and hard magnetic materials. Transformers construction and parameters. Magnetic recording and rep F7ABBTZS           Tomographical Imaging Systems         Tomographical Imaging Systems           CT systems (basic principle, schematic arrangement system, basic physical principle, developmental generations, basic principles of reating image data used in medicine, the principle of methods their scanning, digilization a function and properties of scanning image means in context, which is important especially in terms of interdisciplinarity of the subject an a function to Signals and Systems. To explain main principles on applications from biology and medicine. Telestons in computer laboratories by means of MATLAB.	er equipment (modeling, cir ribution of ele purce and elec Electrical cur t, basic princip ectromagnetic roduction of s construction). and especially nd subsequer d the field as to become acc to become acc to become acc to become acc to sin human he gy of organ sy simply transfor to n successfu rise definition ches of biome egulatory obli nedical device re. The aim is I regulations, nacare. Prerequ f legislation ir a should be at	Another object cuit theory, pneu Z,ZK cutrical energy. C cutrical appliance, rrent in semicono ole in elementary c wave, spreadin ignals. Electromo Z,ZK Imaging system laboratory exerc nt processing, or a whole. Z,ZK quainted with ba ZK alth and disease stems and comportable to clinica of disease, com edical engineerin KZ igations in health es, Iso with legisl to acquaint stud but on acquainti uisites and co-re in this area. Outp	spitals. These ve of the course imatic elements, 4 onnection of the impedance ductor, type of circuit. Unipolar g, interference, otors principles. 4 s magnetic ises provide n the principle of 4 sic mutual 2 a. At the very lexity of disease al and technical course Anytomy prehension and g. 2 neare, especially ative regulations ents with the ng students with quisites: To ut knowledge,

### Name of the block: Compulsory elective courses

#### Code of the group: F7ABB PV 2S 20

Name of the group: Biomedical Technology compulsory optional course

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 6) Requirement courses in the group: In this group you have to complete at least 1 course (at most 3) Credits in the group: 2

#### 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
F7ABBEZP	Economics of Health Services	KZ	2	1P+1C	L	S
F7ABBMAT	Marketing of Medical Technology Petra Hospodková Petra Hospodková Petra Hospodková (Gar.)	KZ	2	2P	L	S
F7ABBPPP	Programming Tools Christiane Malá, Martin Vít zník Christiane Malá	KZ	2	2C	L	S

# Characteristics of the courses of this group of Study Plan: Code=F7ABB PV 2S 20 Name=Biomedical Technology compulsory optional course

F7ABBEZP	Economics of Health Services	KZ	2
Basic category of hea	alth care facility economics (hospitals, public and private health care facility) as: facility effectiveness, costs and income, financi	al management in	health care,
health care marketing	etc. Specifics of health care facilities. Integral view of functioning of health care companies view on health care "company". De	velopment of know	vledge and skills
in the field of financia	I management tools.		
F7ABBMAT	Marketing of Medical Technology	KZ	2
Marketing fundament	als, products management, basic knowledge concerning export activities in the field of marketing and commercial health care	echnology. Practi	cal cases are
presented including h	ealth care technology companies from the Czech Republic. Discussion and analysis of the real products are included in the ex	ercises.	
F7ABBPPP	Programming Tools	KZ	2
Introduction to softwa	re tools on MS Windows platform and GNU/Linux platform. Short introduction of several software tools (MS Word, Excel, Late)	, K, Powerpoint) and	1 programming
languages (Python, F	R. Java, CSS, bash) .		

#### Code of the group: F7ABB PV 3S 20

Name of the group: Biomedical Technology compulsory optional course

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 6) Requirement courses in the group: In this group you have to complete at least 1 course (at most 3) Credits in the group: 2

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
F7ABBBFT	<b>Biophotonics</b> Jan Mikšovský, Jan Remsa <b>Jan Remsa</b> Jan Mikšovský (Gar.)	КZ	2	2P	Z	S
F7ABBFVP	Multivariable Calculus Petr Maršálek Petr Maršálek (Gar.)	KZ	2	1P+1C	Z	S
F7ABBMFJ	Physical Phenomena Modeling in COMSOL MULTIPHYSICS Jan Vrba, David Vrba David Vrba (Gar.)	KZ	2	1P+1C	Z	S

# Characteristics of the courses of this group of Study Plan: Code=F7ABB PV 3S 20 Name=Biomedical Technology compulsory optional course

F7ABBBFT	Biophotonics	KZ	2
Overview of principle	s and applications in the interdisciplinary sphere, connecting physics, optics and biology. Interaction of laser radiation w	vith matter, interaction of ra	adiation with
tissue, biology basics	, photobiology, bioimaging, basics of lasers, laser safety, optical biosensors, photodynamical therapy, optical manipulation v	with cells, nanotechnology	for biophotonics,
biomaterials for photo	onics.		
F7ABBFVP	Multivariable Calculus	KZ	2
F7ABBMFJ	Physical Phenomena Modeling in COMSOL MULTIPHYSICS	KZ	2
Numerical simulation	s are increasingly being used to develop new and optimize existing products and devices. Numerical simulations can gr	reatly reduce the number of	of prototypes
needed and thus sigr	nificantly accelerate and reduce development costs. Another sector where numerical simulations are used is a sector where numerical simulations are used is a sector where numerical simulations are used is a sector where numerical simulations are used in a sector where numerical simulation is a sector where numerical simulations are used in a sector where	here it is difficult to verify c	ongoing physical
processes (eg, heatir	ng the biological tissue under electrodes for direct brain simulation). Last but not least, based on numerical simulations,	we can plan treatment wh	nere, based on
knowledge of materia	al properties, we can define the amount of power delivered to the device (eg radiofrequency ablation in oncology or card	liac surgery). Computer m	odeling involves
the creation of geome	etry, setting of material properties and boundary conditions and, last but not least, the choice of differential equations, the	method of discretization of	of the computing
area and the process	sing of results. The accuracy of the results obtained, the length of calculations and the computational power requirement	ts are very dependent on	the numerical
model setting. The le	ctures cover the most common problems in electrical engineering, thermics, mechanics, chemistry, acoustics and fluid	dynamics. The acquired kr	nowledge will be
tested by the student	s when designing individual parts of devices and devices.		

#### Code of the group: F7ABB PV 4S 20

Name of the group: Biomedical Technology compulsory optional course Requirement credits in the group: In this group you have to gain at least 2 credits (at most 10) Requirement courses in the group: In this group you have to complete at least 1 course (at most 5) Credits in the group: 2

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
F7ABBDIZ	Detectors of Ionizing Radiation	KZ	2	2P	L	S
F7ABBMDT	Microwave Diagnostics and Therapy Jan Vrba, David Vrba Jan Vrba Jan Vrba (Gar.)	KZ	2	1P+1L	L	S
F7ABBPTI	Principles and Practice in Tissue Engineering Roman Mat jka Roman Mat jka Roman Mat jka (Gar.)	KZ	2	0P+2C	L	S
F7ABBSJ	Scripting Languages Tomáš Kraj a Radim Krupi ka Radim Krupi ka (Gar.)	KZ	2	2C	L	S
F7ABBVBI	Virtual Bioinstrumentation Roman Mat jka Roman Mat jka (Gar.)	KZ	2	1P+1L	L	S

# Characteristics of the courses of this group of Study Plan: Code=F7ABB PV 4S 20 Name=Biomedical Technology compulsory optional course

F7ABBDIZ	Detectors of Ionizing Radiation	KZ	2				
Types of gas filled detectors, DC mode of IC, pulse mode of IC, proportional counters, pulse shape of proportional counter, neutron detection and spectrometry by means of nuclear							
reactions, principle of G	eiger-Mueller counters, corona counter, preliminary of the scintillation detectors, exploitation of organic (solid and/or liquid) s	cintillators, Cerer	nkov detector,				
semiconductor detector	s, Li compensated Ge detectors and HPGe detectors as photon detector.						
F7ABBMDT	Microwave Diagnostics and Therapy	KZ	2				
Interaction of the EM fie	eld with biological tissues and its use in diagnostics and therapy. Numerical methods suitable for modeling these interactions.	Basics of microw	ave imaging				
(MWI). Perspective app	lication of microwave techniques in medical diagnostics: non-invasive monitoring of blood glucose concentration, microwave	detection and clas	ssification of				
cerebral vascular events	s and early detection of breast cancer. Therapeutic systems and applicators for microwave and RF local and regional hyperth	ermia. Planning ti	reatment. Design				
and testing of applicato	rs.						
F7ABBPTI	Principles and Practice in Tissue Engineering	KZ	2				
F7ABBSJ	Scripting Languages	KZ	2				
The aim of the course is	to understand the topic of scripting languages and their applications, to understand their advantages and disadvantages and	their complement	arity with system				
languages. Students wi	Il become familiar with regular expressions and tools for word processing. The course focuses on the scripting languages with	hin the Unix operation	ating system and				
the scripting languages	Python.						
F7ABBVBI	Virtual Bioinstrumentation	KZ	2				
This subject deals with	process of development of application in LabVIEW using Virtual Instrumentation concept. During the course will be explained	basic concepts of	of programming				
like variables, data strue	like variables, data structures, cluster, loops, conditionals, typedefs, advanced coding concepts like event driven programming, multi-threaded application development, data queues						
and FIFOs, synchronisation, process of deployment, executable building, installer and upgrades. The students are able also to obtain the CLAD (Certificate LabVIEW Associate							
Developer) certificate. T	his certificate is first step in knowledge of VI.						
L							

#### Code of the group: F7ABB PV 5S 20

Name of the group: Biomedical Technology compulsory optional course

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

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
F7ABBAZD	Biomedical Data Analysis and Processing Jan Kauler	KZ	2	1P+1C	Z	S
F7ABBMTB	Microprocessors in Biomedicine Lenka Hanáková, Pavel Smr ka, Karel Hána, Jan Broulím Karel Hána Pavel Smr ka (Gar.)	KZ	2	1P+1L	Z	S
F7ABBTA	Technical Audiology	KZ	2	1P+1L	Z	S
F7ABBZOD	Image Data Processing Zoltán Szabó Zoltán Szabó Zoltán Szabó (Gar.)	KZ	2	1P+1C	Z	S

## Characteristics of the courses of this group of Study Plan: Code=F7ABB PV 5S 20 Name=Biomedical Technology compulsory optional course

 F7ABBAZD
 Biomedical Data Analysis and Processing
 KZ
 2

 Time series analysis, tr=nds, mutual dependency, stationarity. Correlation function and covariance function. Algorithms of correlation function estimation. Impact of re—oving trends to autocorrelation function. Periodogram - relationship between corellogram and periodogram. Frequency spectrum, spectrum of random signals. Linear frequency filtering. AR, ARMA, and MA processes. Spectral analysis. FFT algorithm. Non-parametric methods of the frequency spectrum estimation. Positives and negatives of the spectral analysis. Repeated measurements and analysis of their properties. AR a ARMA model parameter identification. Prediction. Bivariance analysis of time series - cross-correlation and cross-covariance and their estimation. Bispectrum.

F7ABBMTB Microprocessors in Biomedicine	KZ	2			
The aim is to explain the principles and building blocks of a microprocessor system, the structure of a microprocessor, the connection of basic perip	herals, the progra	mming model of			
a microcomputer system in the form of a practically oriented explanation and demonstration tasks. Provide a basic overview of ATMega and ARM Co	ortex M architectu	res with practical			
examples of their programming with examples of use in biomedicine. Prerequisites and co-requisites: basic knowledge of digital technology and sigr	al processing, ba	sics of ISO C.			
Output knowledge, skills, abilities and competencies: The student is familiar with the selection and design of microprocessor system solutions for us	e in biomedicine.	It manages the			
configuration and program control of these building blocks of the microprocessor system: digital inputs and outputs, A / D and D / A converters, serial	al and parallel con	nmunication,			
counters and timers, interrupt controller. Understands the basics of communication of microcomputers with the environment: interfaces for LCD disp	ays, keyboards, F	RS232, Ethernet,			
WIFI, Bluetooth, XBee and mobile 3G / 4G communication, GPS / GLONAS localization.					
F7ABBTA Technical Audiology	KZ	2			
The aim of the course is to give students a basic overview of audiology, i.e. basic knowledge of biology, medicine and technology in relation to norm	al and impaired h	earing, and all			
this in an interrelated context with emphasis on technical aspects. Motivation to work in clinical practice in audiology is also an integral part of this go	oal. workplace. Co	ourse entry			
requirements: These requirements are expressed as prerequisites and a detailed breakdown of the requirements is as follows: - nervous system - org	anisation and fund	ction of the CNS,			
internal environment of the CNS (blood-brain barrier, cerebrospinal formation, transport and function), neuroglia, motor nervous system, spinal cord	(structure, reflexe	es), - nervous			
system - motor system, brainstem (structure, reflexes), cerebellum (structure, reflexes), basal ganglia (structure, reflexes), cerebral cortex (structure,	rexlexes), physiologic	ogy of movement			
control, - sensory nervous system - receptors, skin sensation, movement and position perception, vision, hearing, taste, smell, pain, autonomic nervous	system, brain ster	n, hypothalamus,			
peripheral compartments: sympathetic and parasympathetic, - waves, types of waves, successive waves, interference, standing waves, sound, - types	of signals, basic s	ignal operations,			
signal decomposition, - harmonic analysis, Fourier transform for continuous and discrete signals, DFT, FFT, - convolution, - technical and biological	systems, systems	and their			
description, linear and non-linear system, - external description of continuous and discrete linear system - differential/differential equations, transfer fu	nctions, frequenc	y characteristics,			
distribution of zeros and poles, time characteristics, - coupling of systems, feedback loops, - Characteristics of basic biosignals EEG, ECG, EOG, EI	P, EMG, artefacts,	, origin, sources,			
diagnostic applications, frequency range and bands, - Biological data acquisition and preprocessing, basic computer conversion chain, A/D converter					
quantization, Nyquist theorem, conversion errors, signal conditioning, aliasing, filtering, trends, sensing options. Output knowledge, skills, abilities ar	nd competences:	Students will			
acquire a basic understanding of acoustics, measurement and diagnosis of auditory functions, including technical principles. instrumentation and so		•			
replacements. The students will be able to orient themselves. They will be able to learn about these issues, learn about other areas of medical instrumentation and methods used in					
clinical practice, as well as motivated and ready to enter the field of audiology upon graduation and to add to this knowledge and advanced skills within the framework of the so-called					
certified course, which, according to Act 96/2004 Coll., allows for the acquisition of the so-called "certificate of audiology". Special professional competence Technical audiologist after					
graduation, i.e. after obtaining the so-called professional competence Biomedical technician under the Act.					
F7ABBZOD Image Data Processing	KZ	2			
Continuous image representation, linear 2D systems, 2D spectrum, Digital representation of images, Basic image characteristics: brightness, contrast, resolution, noise, look up tables,					
histogram, Discrete Fourier transform, discrete cosine transform, image enhancement, geometric operations, image filtering, morphological operation	ns, image restora	ation, image			
segmentation, basic principles of image compression					

#### Code of the group: F7ABB PV 6S 20

Name of the group: Biomedical Technology compulsory optional course Requirement credits in the group: In this group you have to gain at least 2 credits (at most 6) Requirement courses in the group: In this group you have to complete at least 1 course ( at most 3) Credits in the group: 2

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
F7ABBAZC	Algorithms for Biosignals Processing in the C Language Pavel Smr ka	КZ	2	1P+1C	L	S
F7ABBEMP	Electromagnetic Fields of Living Organisms Jan Vrba, Ond ej Fišer Ond ej Fišer Jan Vrba (Gar.)	KZ	2	1P+1L	L	S
F7ABBRBL	Robotics in Medicine	KZ	2	1P+1C	L	S

# Characteristics of the courses of this group of Study Plan: Code=F7ABB PV 6S 20 Name=Biomedical Technology compulsory optional course

F7ABBAZC	Algorithms for Biosignals Processing in the C Language	KZ	2			
The principle and impler	The principle and implementation of the most used algorithms for biosignal processing and their specific functional (and time and memory efficient) implementation in C and C++					
be explained in the form	of a practically oriented interpretation and demonstration tasks. Graduates will be acquainted with specific solutions to basic	algorithmic probl	ems in biosignal			
processing: with segmer	ntation, analysis in the time and frequency domain, with the design of linear digital filters (FIR and IIR) and with the visualiza	tion of results. Pre	requisites and			
co-requisites: basic know	wledge of systems and signal processing, basics of ISO C. Output knowledge, skills, abilities and competences: The student	is familiar with alg	porithms for			
preprocessing and intell	igent segmentation of biological time series in C and C ++, eg: FFT algorithm, SFFT and wavelet transforms, algorithm for c	alculating autocor	relation and			
cross-correlation function	ns, convolution, etc. Can implement in C language the floating time window method for feature extraction and basic algorithms	for the design and	l implementation			
of digital FIR and IIR filte	ers. Understands and can implement in C language the basic ways of visualization of biological data and the results of their	processing.				
F7ABBEMP	Electromagnetic Fields of Living Organisms	KZ	2			
Static and quasi-static e	Static and quasi-static electric and magnetic fields, electromagnetic fields. Electrical and magnetic properties of biological tissues. Electrical, magnetic and electromagnetic stimulation					
in medicine. Anatomical and physiological bases of bioelectromagnetism. Bioelectric sources and conductive environment. Integral relations of electrodynamics of bioelectric fields,						
electrodynamic aspects of mathematical modeling of electrocardiography and electroencephalography. Topographic concept of bioelectrical and biomagnetic measurements. Methods						
and techniques of measurement. Human-robotic limb replacement interface.						
F7ABBRBL	Robotics in Medicine	KZ	2			

### List of courses of this pass:

TABBACIP         Occupational Safety and Health, Fire Protection and First Aid         Z         D           FrABBAX         English Language (IIk (part 1))         KZ         2           The aim of the curves its in increase students language competences in accesses. English and polescenal vanishing, student system communications, students should be able to wind calculate whend system. We address could adjust the curves of the different system communication students during and the student of the student and polescenal vanishing. Students should be able to wind calculate and polescenal vanishing. Students should be able to wind calculate and polescenal vanishing. Students should be able to wind calculate and polescenal vanishing. Students should be able of the system.         ZZK         4           F7ABBAA         English Language BIII (Gart 2)         ZZK         4           F7ABBAA         Anatomy and Physiology II.         ZZK         4           F7ABBAA         Algorithms for add back symbolic on the company. Cannot physiology II.         ZZ         4           F7ABBAA         Algorithms for add back symbolic on the company. Cannot physiology II.         ZZ         2           F7ABBAA         Algorithms for add back symbolic on the company. Fo	Code	Name of the course	Completion	Credits	
The ear of the outries is to increase student: Inspace concence in sealer Englie and presented vocabule, yoo with commo communication shills. Students induce devices is a device of english and the sease-attent of the device induced devices is a device of english and the sease-attent of the device induced devices.           F7ABBAB         English Language IIII (part 2)         KZ         2           F7ABBAP         Anatomy and Physiology I.         Azatomy and Physiology I.         Azatomy and Physiology I.         Azatomy and Physiology I.           F7ABBAP         Anatomy and Physiology I.         Azatomy and Physiology I.         Azatomy and Physiology I.         A           F7ABBAP         Anatomy and Physiology I.         Azatomy and Physiology I.         A         A           F7ABBAP         Anatomy and Physiology I.         Azatomy and Physiology I.         A         A           F7ABBAP         Anatomy and Physiology I.         Azatomy and Physiology I.         A         A           F7ABBAP         Anatomy and Physiology I.         Azatomy and Physiology I.         A         A           F7ABBAP         Anatomy and Physiology I.         Azatomy and Physiology I.         A         A           F7ABBAP         Anatomy and Physiology I.         Azatomy and Physiology I.         A         Z         Z           F7ABBAP         Internet of the addition and memory and anatomy and physiology I.         A         A	17ABOZP	Occupational Safety and Health, Fire Protection and First Aid	Z	0	
bits to out-scheduly with academic text. undersined and be able to use base terminology and be aware of the different dystets (newls of English and the associated synthetic and lock of an and the second and t	F7ABBA3A	English Language IIIA (part 1)	KZ	2	
Instal dwints.         FrakBaA38         English Language (IIIE (part 2))         KZ         2           F7ABBAA51         Anatomy and Physiology 1.         KZ         4           F7ABBAF1         Anatomy and Physiology 1.         KZ         4           F7ABBAF1         Anatomy and Physiology 1.         KZ         4           F7ABBAF2         Anatomy and Physiology 1.         KZ         4           Apotterin, and success. Identification asserterin, consultant of the success and programming the images. Reactive and theritive methods, messation and theritive methods, messati	The aim of the cou	rse is to increase students' language competence in academic English and professional vocabulary, along with common communica	tion skills. Student	s should be	
Tracking activities in the unimore semicar are project-based.         ZZK         4           F7ABBAF1         Anatory and Physiology 1. Units to Anatory and Physiology 1. The subject correst for local arges on their systems.         ZZK         4           F7ABBAF2         Anatory and Physiology 1. Units to Anatory and Physiology 1. The subject correst of the sub-test systems.         ZZK         4           Again-file, data structures. Identifiers, data types. assignment statement, cortical astartent, cystem.         FABBA20         KZ         4           Again-file, data structures. Identifiers, data types. assignment statement, cortical astartent and the sub-test cortical arges agains.         FAC         2           F7ABBA20         Again-file, data structures. Identifiers, data types.         FAGBA20         KZ         2           Fraction and the structure for agains and the structure transport.         FAGBA20         Again-file, data structure againstructure to the structure for againstructure to the structure for againstructure to the structure for againstructure to the structure transport.         KZ         2           Fraction and the structure for againstructure to the structure for agai					
F7ABBAF1         Anatomy and Physiology I.         Z.ZK         4           F7ABBAF2         Anatomy and physiology IIIns to Anatomy and Physiology III.         Z.ZK         4           F7ABBAF2         Anatomy and Physiology IIIns to Anatomy and Physiology III.         Z.ZK         4           F7ABBAF2         Anatomy and Physiology IIIns to Anatomy and Physiology III.         K2         4           F7ABBAF2         Agorithmic and Programming Theory         KZ         4           Agorithmic and Programming Indementation of sumulation sumulation of sumulation of sumulation of sumulation of	F7ABBA3B		KZ	2	
Anatomy and physiology Lovers functional aspects of particular oper and their systems.         Z.ZK         4           F7ABBA7         Anatomy and Physiology. The subject overs functional aspects of particular oper and their systems.         KZ         4           Agorithm, data structures, lowerfillers, data types, assignment statement, conditional tatement, volves. Arthmetical and logical operations on structure Spectraming To Canguage.         KZ         4           Matter and asserbles, implementation of basic incording a basic algorithms in C Language. Recursive and teraits ements, down their systems.         KZ         2	F7ABBAF1		Z.ZK	4	
Anatomy and physiology II links to Anatomy and Physiology I. The subject overs functional aspects of particular operator the IX         4           Apportime, index functions. Identifies, data spee, assignment statement, conditional statement, operation of subpect operator in the Integration of another the integrate the integration of another the integration of anot		, , ,	_,	•	
F7ABBALP         Algorithmic and Programming Theory         KZ         4           Agentm, data structures, locatifics, data byses, assignment stement, conditional statement, conditional segments and statement and statement conditional segments and statement conditional segments with introduction to achieve engineering.         F7ABBAC         Algorithmic and engineering and statement, conditional statement, condinal statement, statemant, statemant, statemant, statemant, stat	F7ABBAF2	Anatomy and Physiology II.	Z,ZK	4	
Agoritm, data structures. Isoerithers, data byses, assignment stain-ment, conditional stain-ment, cycling. Atthinicitical and logical operations, Digatal ingresentation of numbers, "numeration y agoritm ingressing along building and tractures of any logical programmers view. Introduction to Structures or any logical ingressing along the numerical alignmentation and assist introduction to Structures and Parkes alignmentation. These increases and along along the CL anguage K assist and assist alignmentation of these increases and these alignmentation and the numerical alignmentation and align alignmentation and alignmentation and the adiagn of line adignation and a compare (fincing method in the final method and the dissign of line adignation and compare alignmentation and align and the adignation align adignation and compare alignmentation and align and transforms alignment the adignation and adignation process alignmentation and align and transforms. The student is familiar with algorithms for a collading align adignation and correspondent and analysis and Processing in the adignation alignment and analysis and processing in the adignation alignment and analysis and processing in the adignation alignment and analysis and processing and the alignment alignment and analysis and processing in the adignation. Prace of the maximum and analysis and Processing and the alignment and analysis and processing alignment and analysis and processing and the alignment alignment and analysis and processing alignment and analysis and processing and the alignment and analysis and processing alignment and analysis and processing and the alignment and analysis and processing alignment and analysis and processing alignment and analysis and processing alignment and analysis		Anatomy and physiology II links to Anatomy and Physiology I. The subject covers functional aspects of particular organs and their	systems.		
systems, Introduction to structured programming in C language - building and structure of simple programs, creating of the seter functions, user input and cuput, the management, types, data scriting and searching, indementation of basic numerical algorithms in Linguage. Recursive and there there methods, measuring algorithm quilt). TABBASC A ADD Statest data-types, data scriting and searching, indementation of basic numerical algorithms for Biosignal Processing in the C Language. Net were and the specific duritical (and time and menoy efficient) implementation in C and C + + vitable acquisited with specific solutions to basic adjorithme role frequency darks. Graduase were and specific solutions to basic adjorithme role frequency darks. Graduase were adjust filters of the dasgrad method regarder scalar darks. Graduase were adjust filters of adjust filters of the dasgrad method regarder scalar darks. Graduase were adjust filters of the dasgrad method regarder scalar darks and compositions. The studeet scalar of the dasgrad method regarder scalar darks and the results of the dasgrad method regarder scalar darks and the results of the dasgrad method regarder scalar darks and the results of their processing. FX T adjorithme for fragmage the basic ways of visualization of biological target and the results of their processing. FX T Bajaotithm, SFFT adjorithm of correlation function settination. Impact of remover darks and the results of their processing. FX T Bajaotithm, Steperating and their scalar darks and the results of their processing. FX T Bajaotithm, Steperating and their scalar darks and their scalar darks and their scalar darks and their scalar darks and their scalar darks. Charakaes and scalar darks and the results of their processing and their scalar darks and their scalar darks. Charakaes and their scalar darks and their sca			1	-	
memory management. Practical overview of programming techniques and basic algorithms in C language. Recursive and ferative methods, messuring algorithm quality, Astrikat data- types, data sourding, implementation of tasks in introduction to boinsering processing in the C Language. K Z   2 to principle and integrine most used algorithms for Biosignals Processing in the C Language. K Z   1 to principle and integrine most used algorithms for Biosignals Processing in the C Language. K Z   1 to principle and integrine most used algorithms for Biosignals Processing with the addition to basic algorithms in biosignal processing with segmentation, analysis in the firm and frequency dorman, with the design of inner dignal fitters (FR and the fitters) on calculating autocorregulates and correquisites basic howledge of systems and signal processing, basis of ISO C. Output howledge, skills, altities and comprehenses of calculating autocorregulation and cross-correlation functions. convolution, etc. Can implement in C language the basic ways of visualization to biological data and the results of their processing. F7ABBAZD   Biomedical Data Analysis and Processing with window method for feature systems of and saudices functions. Agorithm for the design of integring the skills ways of visualization to biological data and the results. Repeated analysis, Repeated maskings, Repeated analysis, Repeated maskings, Repeated maski	-				
types, data sarding and searching, implementation of basic numerical alignithms. Intraduction to biometical data processing and their specific functional (and time and morey efficient) implementation in C and C ++ will be explained in the form of a practically oriented interpretents and demonstration to take. Graduate will be acquirated with specific solutions to basic algorithms processing and their specific functional (and time and morey efficient) implementation in C and C ++ will be explained in the form of a practically oriented interpretents and demonstration tasks. Graduate will be acquirated with specific solutions to basic algorithms processing, and interpretents and explanation of the solution of rausks. Prorequirates solutions for the design and implementation of display the sequence of their processing. The TATE STATE STAT	-		-	-	
F7ABBA2C       Algorithms for Biosignals Processing in the C Language       KZ       2         The principie and implementation of the more used algorithms for biosignal processing with the specific turcionus (and size multiple explaints) in the more and enonytration ranks. Graduates will be acquainted with specific turcionus in C and C + will be provide the specific turcionus (and size multiple explaints). The multiple explaints in the turcion of mean enonyte multiple explaints of biological time services in C and C + will be provided the state of the multiple explaints for for more and the provided of systems and the processing.       KZ       2         F7ABBA2D       Biomedical Data Analysis and Processing D enonyte will be acquisited with system for a multiple explaints. FFT algorithm: SFT and will be visualization of biological data and the results of their processing.       KZ       2         Time sense analysis, trends, mutual dependency, statiours from enonyte on evolution. Providens in elitorabic bieven contegions and pendogan Freguency spectrum, spectrum estimation. The states and the results of their processing.       KZ       2         The course is intereded for all sudents who need to supplement their from elitorabic bievence on evolution. The states and analysis. FFT algorithm: Non-parametrix methods of the requency spectrum estimation. The states and the specific and analysis.       LZ/K       4         The course is interfede for all sudents who need to supplement their from elitor for the states in elitorabic states.       Specific and the states in elitorabic states in elitorabic states in elitorabic states.       ZZ/K       4         The course is interinded for all sudents w					
The principle and implementation of the most used agenthms for biological processing and their specific functional (and time are memory efficient) implementation in C and C ++ will be explained in the form of a practically oriented interpretents and demonstration tasks. Graduate will be acquired with specific solutions to bacis algorithms processing, and intelligent segmentation of biological time series in C and C ++, egr (FT algorithm, SFT and weeles transforms, algorithm for calculating autocorrelation and cross-science interpretences. The statient is familiar with algorithms for the design and implementation of biological time series in C and C ++, egr (FT algorithm, SFT and weeles transforms, algorithm for calculating autocorrelation and implementation of digital FIR and IR littles; Understands and can implement in C language the basic ways of visualization of biological data and the results of their processing. IFT Algorithm, Nor-parametri to C tanguage the basic ways of visualization of biological times are in a divise. FFT algorithm, Nor-parametri methods of the frequency spectrum, Sectrum dradom signitisk. Interds, manual dispendency, stationarty, Correlation function, advantation, and yoss of their properties. AR a ARMA norded parameter identification. Predience analysis of time series - orress-correlation and cross-covariance and their estimation. Biointerica and RMI statistics. Biointerica and RMI biointerica and RMI statistics. Bioin					
be explained in the form of a practically oriented interpretation and demonstration tasks. Graduates will be acquaited with specific solutions to basic algorithmic problems in biosignal processing, with segmentation, analysis in the time and frequency domain, with the design of linear diptal filters (PR and IRR) and with the visualization of acquisities and corroration functions, convolution, etc. Can implement in C language the floating time vividow method for feature extraction and basic algorithms for the design and implementation on digital linear diptal filters without the familiar with algorithms for the design and implementation on digital linear diptal filters without wells that of the results of their processing.  FFABBAZD Biomedical Data Analysis and Processing K.Z. 2 Interpretation function, scruturiation, the contraints of the processing secture stratector analysis of the specteal analysis. FT algorithm N carls and the interions and contraints functions and contraints functions and contraints functions. Positives of their specteal analysis of the specteal analysis of the specteal analysis. The advise analysis of the specteal analysis of the specteal analysis of the specteal analysis. The advise and regative extra and regative extra and the advise and their sections of the specteal analysis. The advise and regatives of the specteal analysis of the specteal analysis of the specteal analysis of the specteal analysis. The design and their straints on the design and frequency filtering. AR, ARMA media parameteric methods of the frequency spectrum seture strates and regative and negative design and their knowledge about to there analysis of the specteal analysis. The specteal analysis of the specteal analysis and the specteal analysis and the specteal analysis of the specteal analysis of the specteal analysis of the specteal analysis of the specteal analysis and the specteal analysis of the specteal analysi			1		
processing with segmentation, analysis in the time and frequency domain, with the design of linear digital filters (FIR and IRF) and with the visualization of results. Preveaulises and one processing, basics (FIR add) (FIR add					
co-requisites: basic knowledge of systems and signal processing, basics of ISO C. Output knowledge, skills, skills shills and norgeneticnes: The student is familiar with algorithms for a display of the foreign and implementation of biological data and here sexuits of their processing.     FABBAD     Isomedical Data Analysis and Processing     K2     2     Time series analysis, trends, mutual dependency, stationarly, Correlation functions, convolution, etc. Can implement in C language the basic ways of visualization of biological data and here sexuits of their processing.     K2     1     Time series analysis, trends, mutual dependency, stationarly, Correlation function and covariance function. Algorithms of correlation function series - cross-correlation and cross-coverlation and processing.     FABBAB     Biomechanics and Bio				-	
cross-correlation functions, convolution, etc. Can implement in C language the floating time window method for feature extraction and basic agontimus for the design and implementation.       V       2         F7ABBAZD       Biomedical Data Analysis and Processing       KZ       2         Time sense analysis, trands, mutual dependency, stationarity, Correlation function and cavairance function. Algorithms of correlation function estimation. Impact of termoving trends to autocorrelation function. Reindogram - relationship between correlation and proteing trans.       Immet relationship and processing.       KZ       4         An Adv processes. Spectral analysis. FFT algorithm. Non-parametric methods of the frequency steering, AR, ARMA, and MA processes. Spectrum serters on relation serters - cross-correlation and cross-corelation and cross-corelation and cross-correlation and cross-corr					
of digital FIR and IIR fitters. Understands and can implement in C Imguage the basic ways of visualization of biological data and the results of their processing       KZ       2         Time series analysis. Itends, mutual dependency, stationarily. Correlation function. Agorithms of correlation function estimation. Impact of monying trends to autocorrelation function. Periodogram - relationship between corelogram and periodogram. Frequency spectrum, spectrum, spectrum, equivalent on equivale of the spectral analysis. FT alignific muchos de transmosteria. Nearing and the results of their estimation. Bispectrum.         FABBBER       Biomechanics and Biometerials       Z.ZK       4         The course is indend for all students who need to supplement their knowledge a hour sequence theoret analysis. The agorithm is particip contracting problems.       Texator the student does not choose the subject of the chanics and the subsequent issues in related subjects, sepacelally the subject of Mechanics and Robotics in Medicine. If the student does not choose the subject and has never had the opportunity to complete these basic knowledge.       Z.ZK       2         F7ABBCH       Biochemistry       Z.ZK       2         Course participants will be introduced to the basics of Biochemistry The course builds on the knowledge.       Z.ZK       2         F7ABBCH       Biochemistry       Z.ZK       2         Course participants will be introduced to the basics of Biochemistry       Z.ZK       2         Course participants will be introduced to the basics of Biochemistry       Z.ZK       2       2 <td></td> <td></td> <td>-</td> <td></td>			-		
F7ABBA2D         Biomedical Data Analysis and Processing         KZ         2           Time series analysis, trends, mutual dependency, stationarily, Correlation function and covariance function. Algorithms of correlation function metimation. Impact of removing trends to autocorrelation function. Periodicols generatives of the spectreal analysis. F7aBBA           and MA processes. Spectral analysis. FT algorithm. Non-parametric methods of the frequency spectrum estimation. Dispectrum. Sentimetical analysis of their properties. AR a ARM model parameter identification. Prediction. Biveriance analysis of time specific practical problems.           F7ABBAB         Biomechanics and Biomaterials         Z.ZK         4           The course is intended for all students who need to supplement their knowledge and have a general knowledge about biomechanics and fission in Medicine. If the student does not choose the subject and have new had the opportunity to complete these basic knowledge, they will be acposed to the tisk of misunderstanding the subsecurit students who need to supplement their knowledge about the basic knowledge.         Z.ZK         2           Course participants will be introduced to the basics of Biochemistry. The course builds on the knowledge gained in general chemistry and extends this knowledge about the chemistry of living systems (minicial laboratory, which are part of the follow-up chemistry and extends shull be coursed on broadening the trajes discussed in the lectures and their practical methodic processes. Particular attention is paid to the aspecta necessary for understanding the methods of work in the biochemical and onicidal baboratory technicity of structure of bioophocies.         Z.ZK         2             Overewise of	cross-correlation fu	nctions, convolution, etc. Can implement in C language the floating time window method for feature extraction and basic algorithms for	the design and imp	lementation	
Time series analysis, tends, mutual dependency, stationarity, Correlation function and covariance function. Agorithms of correlation function estimation. Impact of removing trends to autocorrelation function. Periodicity appectrum, spectrum, of nanoma signals. Linear frequency literation, AR, ARM, and Ma processes. Spectral analysis of the poperties. AR a ARM model parameter identification. Prediction. Biopertum estimation. Positives and negatives of the spectral analysis. Repeated analysis of their poperties. AR a ARM model parameter identification. Prediction. Biopertum estimation. Expectance and their estimation. Biopertum.  F7ABBBBC F7ABBBCM Biomechanics and Biomaterials C.ZK 4 The course is intended for all students who need to supplement their knowledge athout to model parameter identification. Biopertum.  F7ABBCH Biomechanics and Biomechanics and Biomaterials C.ZK 4 The course is intended for all students who need to supplement their knowledge, they will be exposed to the triak of misunderstanding the subsect in related subjects, in which this is not taken into account the basic knowledge.  F7ABBCH Biomechanics of biological systems (amino acids, periodise, provide) will be exposed to the basic knowledge.  F7ABBCH Biomechanical and clinical laboratory, which are part of the follow up, chemical disclinite: structures and their practical training especially on the determination of bioimdecular attention is paid to the aspects necessary for understanding the methods of work in the take to advant the basic knowledge the provide the basic soft biochemistry.  F7ABBCH C.VC 2 Course particupants will be introduced to the basics of biochemistry. The course builds on the knowledge gained in general chemistry and extends this knowledge about the chemistry of living systems. The interpretention goes through the basic building structures of biological systems (amino acids, periodisk, proteins, lipids, carbohydrates, nucleic acids), biological internduces and honeolar general trelations with the basic biological syste	of digita	I FIR and IIR filters. Understands and can implement in C language the basic ways of visualization of biological data and the results	of their processing		
autocarelation function. Periodogram - relationship between corellogram and periodogram. Frequency spectrum, spectrum of random signals. Linear frequency littering, AR, ARMA, and MA processes. Spectral analysis CFT algorithm. Non-parameter intendors of the frequency spectrum meshination. Positives and negatives of the spectral analysis. Repeated measurements and analysis of their properties. AR a ARMA model parameter identification. Prediction. Biopetrum estimation. Biopetrum estimation estimation. Biopetrum estimation estimation. Biolic estimation estimatin estimat					
and Mp processes. Spectral analysis. FPT algorithm. Non-parametric methods of the frequency spectrum estimation. Positives and negatives of the spectral analysis. Repeated measurements and analysis of their properties. AR a ARMA model parameter identification. Prediction. Bivariance analysis of time series - cross-correlation and cross-covariance and their estimation. Bispectrum.           F7ABBBB         Z.ZK         4           The course is intended for all students who need to supplement their knowledge and have a general knowledge about biomechanics and tis application in specific practical problems. The content is chosen to be sufficient to understand athe issues in related subjects, specially the subject of Mechanics and Robotics in Medicine. If the student does not choose the subject and have neeres have the opportunity to complete these basic knowledge.         7.2K         2           F7ABBBCH         Biochemistry         Z.2K         2           Course participants will be introduced to the basics of Biochemistry.         Z.2K         2           Course participants will be introduced to the basics of Biochemistry.         R.2K         2           Ourse participants will be introduced to the basics of Biochemistry.         R.2K         2           Vourse participants will be entroduced to the basics of Biochemistry.         R.2K         2           Vourse participants will be entroduced the inportant metabolic processes. Particular attention is paid to the aspects necessary for understanding the methods of writ in the biochemistry and extends this practical attending with respective and biology. Interaction of their properties. Students should become laminari with the basic la					
measurements and analysis of their properties. Are a ARMA model parameter identification. Bispectrum.       F7ABBBB       Biomechanics and Biomaterials       Z,ZK       4         The course is intended for all students who need to supplement their knowledge and have a general knowledge about biomechanics and its application in specific practical problems.       F2,ZK       4         The course is intended for all students who need to supplement their knowledge and have a general knowledge about biomechanics and its application. It the student does not choose the subject in the obsent to subficient to understand athe issues in related subjects, generally the subsequent issues in related subjects, in which this is not taken into account the basic knowledge.       Z,ZK       2         Course participants will be introduced to the basics of Biochemistry. The course builds on the knowledge gained in general chemistry and extends this knowledge about the chemistry intraining especially to abulgerial systems of biological systems (amino acids, peptides, proteins, ligids, carbordynet esp. nucleica acids), biological intervents on broadenling the topics discussed in the lectures and their practical intraining especially on the determination of biomolecules and the verification of their properties. Studies become familiar with the basic laboratory which are part of the follow-up chemical discipline. The laboratory with are part of the follow-up chemical discipline. The laboratories and biology. Interaction of laser radiation with meter, interaction of radiation with tesp, nanotechnology for biophotonics.         F7ABBBT       Biophotonics       kZ       2       2       0       0       2       2       2       2       0 <td></td> <td></td> <td></td> <td></td>					
TrABBBB         Biomechanics and Biomaterials         Z,ZK         4           The course is intended for all students who need to supplement their knowledge and have a general knowledge about biomechanics and its application is pecific practical problems.           The course is intended for all students who need to supplement their knowledge and have a general knowledge, they will be exposed to the risk of misunderstanding the subsecure in subject of Mechanics and Robotics in Medicine. If the student does not choose the busile of an intervention of the opportunity to complete these basic knowledge. If will be exposed to the risk of misunderstanding the subsequent issues in related subjects, in which this is not taken into account the basic knowledge.           F7ABBBCH         Biochemistry         Z,ZK         2           Course participants will be introduced to the basics of Biochemistry. The course builds on the knowledge gained in general chemistry and extends this knowledge about the chemistry of living systems. The interpretation gene timopotant metabolic processes. Particular statention is paid to the aspect necessary for understanding the methods of work in the basic laboratory. Which are part of the follow-up chemical discipline. The laboratories are focused on broadening the topics discussed in the lectures and their practical rothemistry.           F7ABBBFT         Biophotonics         KZ         2         2         0         2         2         2         2         2         0         2         2         2         2         2         2         2         2         2         2         2 <td< td=""><td></td><td></td><td>-</td><td>-</td></td<>			-	-	
F7ABBBB         Biomechanics and Biomaterials         Z,ZK         4           The course is intended for all students who need to supplement their knowledge and have a general knowledge about biomechanics and Robotics in Medicine. If the student does not choose the subject and has never had the opportunity to complete these basic knowledge, they will be exposed to the risk of misunderstanding the subsequent issues in related subjects, in which this is not taken into account the basic knowledge.         F7ABBBCH         Z,ZK         2           F7ABBBCH         Biochemistry         Z,ZK         2	measurements and		alion and cross-cov	anance and	
The course is intended for all students who need to supplement their knowledge and have a general knowledge about biomechanics and its application in specific practical problems. The content is chosen to be sufficient to understand athe issues in related subjects, especially the subject of Mechanics and Robotics in Medicine. If the student does not choose the subject and has never had the opportunity to complete these basic knowledge, they will be exposed to the risk of misunderstanding the subject and has never had the opportunity to complete these basic knowledge, they will be exposed to the risk of misunderstanding the subject of Mechanics and Robotics in Medicine. If the student does not choose the subject of Mechanics and Nolecular genetics to the most important metabolic processes. Particular attention is paid to the aspects necessary for understanding the methods of work in the biochemical and chincial laboratory, which are part of the follow-up chemical discipline. The laboratories are focused on broadening the topics discussed in the letures and their practical training, especially on the determination of biomolecules and the vortification of their properties. Students should become familiar with the basic laboratory techniques of Biochemistry. F7ABBERT Biology kices, photobiology, biomaging, basics of laser, salesr safety, optical biosensors, photodynamical therapy, optical manipulation with cells, nanotechnology for biophotonics, biomaterials for photonics. F7ABBER Biology kices, photobiology, biomaging, basics of function. Structure and conformation of bioplymers (nucleid acids and proteins). The nucleus, plastids, microhomita, Structure and function. Structure and conformation of bioplymers (nucleid acids and proteins). The nucleus, plastids, microhomita, Structure and nucleus a effective since of the structure of chromatin and their phases. Neodoxing and molecule genetics the waynote: each synce since since since and the optical sincertase of the since since since since sincertables, microhomita,	E7ABBBB		7 7K	1	
The content is chosen to be sufficient to understand athe issues in related subjects, especially the subject of Mechanics and Robotics in Medicine. If the student does not choose the subject and has never had the opportunity to complete these basic knowledge, they will be exposed to the risk of misunderstanding the subsequent issues in related subjects, in which this is not taken into account the basic knowledge.           FTABBBCH         Dischermistry         Z.ZK         2           Course participants will be introduced to the basics of Biochemistry. The course builds on the knowledge gained in general chemistry and extends this knowledge about the chemistry of living systems. The interpretation goes through the basic building structures of biological systems (amino acids, peptides, proteins, lipids, carbohydrates, nucleic acids), biological training, especially on the determination of biomolecules and the verification of their processes. Particular attention is paid to the aspects necessary for understanding the methods of work in the biochemical and chinical laboratory, which are part of the follow-up chemical discipant ophenical discipant ophenical discipant ophenical discipant ophenical discipant ophenical scipant is a state state, optical bioensors, photodynamical therapy, optical manipulation with matter, interaction of radiation with tissue, biology basics, photobiology, bioimaging, basics of lasers, laser safety, optical bioensors, photodynamical therapy, optical manipulation with cells, nanotechnology for biophotonics.           F7ABBBC         KZ         2           Lawarotic cells. Plant and animal cell structure and function. Structure and conformation of biopydoms (nucleid acids and proteins). The nucleus, phasids, mitochondria, cytoplasm. Endomembrane system: endoplasmic relicuum, the Golgi apparatus, lysosomes, naculas, microfhondria, cytoplasm; and eastright			1 '	-	
subject and has never had the opportunity to complete these basic knowledge.       In this is not taken into account the basic knowledge.         F7ABBBCH       BioChemistry       Z,ZK       2         Course participants will be introduced to the basics of Biochemistry. The course builds on the knowledge agined in general chemistry and extends this knowledge about the chemistry of living systems. The interpretation goes through the basic building structures of biological systems (amino acids, peptides, proteins, lipids, carbohydrates, nucleic acids), biological training, especialized genetics to the most important metabolic processes. Particular attention is paid to the aspects necessary for understanding the methods of work in the biochemical and clinical laboratory, which are part of the follow-up chemical discipline. The laboratories are followed no broadening the topics discussed in the lectures and their practical training, especialized in the determination of biomolecules and the verification of their properties. Students should become familiar with the basic laboratory techniques of Biochemistry.         F7ABBBFT       Biophotonics       KZ       2         Overview of principles and applications in the interdisciplinary sphere, connecting physics, optics and biology. Interaction of laser radiation with matter, interaction of radiation with tissue, bioogatians in teil or organisms - from acelular through prokaryotic to eukaryotic. The viruses. Prokaryotic cells. Bacteria. Bacterial diseases and their control.         EXARYOUT cells. Plant and animal cell structure and function. Structure and conformation of biophymers (nucleid acids and proteins). The culc use, plastids, milotic (M) phase and interphase (G1, S and C2 phases). The division of cell nucleus - amitosis, phases of mitosis,					
F7ABBBCH       Biochemistry       Z,ZK       2         Course participants will be introduced to the basics of Biochemistry. The course builds on the knowledge gined in general chemistry and extends this knowledge about the chemistry of living systems. The interpretation goes through the basic building structures of biological systems (amino acids, peptides, proteins, lipids, carbohydrates, nucleic acids), biological membranes and medecular genetics to the most important metabolic processes. Particular attention is paid to the aspects necessary for understanding the methods of work in the biochemical and clinical laboratory, which are part of the follow-up chemical discipline. The laboratories are focused on broadening the topics discussed in the lectures and their practical training, especially on the determination of biomolecules and the verification of their properties. Students should become familiar with the basic laboratory techniques of Biochemistry.         F7ABBBFT       Biophotonics       KZ       2         Overview of principles and applications in the interdisciplinary sphere, connecting physics, optics and biology. Interaction of laser radiation with matter, interaction of radiation with tissue, biology basics, photobiology, bioimaging, basics of lasers, laser safety, optical biosensors, photodynamical therapy, optical manipulation with cells, nanotechnology for biophotonics.       KZ       4         Baic Information about the cellular level of organisms - from acelullar through prokaryotic to eukaryotic. The viruses. Prokaryotic cells. Bacterial diseases and their control.       Ex, K       4         Carge basics.       Protosynthesis. The origin of eukaryotes: endosymbiotic hypothesis. Ribosomes. The cryotskeleton: microthubules, microfilame					
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F7ABBBFT         Biophotonics         KZ         2           Overview of principles and applications in the interdisciplinary sphere, connecting physics, optics and biology. Interaction of laser radiation with matter, interaction of radiation with tissue, biology basics, photobiology, bioimaging, basics of lasers, laser safety, optical biosensors, photodynamical therapy, optical manipulation with cells, nanotechnology for biophotonics, biomaterials for photonics.           F7ABBBLG         Biology         Z,ZK         4           Basic information about the cellular level of organisms - from acelullar through prokaryotic to eukaryotic. The viruses. Prokaryotic cells. Bacterial diseases and their control.         Eukaryotic cells. Plant and animal cell structure and function. Structure and conformation of biopolymers (nucleid acids and proteins). The nucleus, plastids, mitochondria, sties of respiration and chloroplasts, sites of photosynthesis. The origin of eukaryotes: endosymbiotic hypothesis. Ribosomes. The cytoskeleton: microtubules, microfilaments. The cell cycle: mitotic (M) phase and interphase (G1, S and G2 phases). The division of cell nucleus - amitosis, mitosis, phases of mitosis, the mitotic spindle; metosis. The cell division - cytokinesis. Cell differentiation. Cell death. Apoptosis and necrosis. Mendelia and modern genetics: structure; function and inheritance of genes. Includes the chemistry and structure of chromatin and chromosomes. Animal tissue histology. Animal cells and tissues. Human genetics. Chromosomal aberrations, genetic disorders and diseases. Genetic engineering. GMO organisms.           F7ABBELS         Biological Signals         Z,ZK         4           The subject deals with origins and description of the most importnat electric and non-efe				•	
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tissue, biology basics, photobiology, bioimaging, basics of lasers, laser safety, optical biosensors, photodynamical therapy, optical manipulation with cells, nanotechnology for biophotonics, biomaterials for photonics.           F7ABBBLG         C,ZK         4           Basic information about the cellular level of organisms - from acelullar through prokaryotic to eukaryotic. The viruses. Prokaryotic cells. Bacteria. Bacterial diseases and their control.         Eukaryotic cells. Plant and animal cell structure and conformation of biophymers (nucleid acids and proteins). The nucleus, plastids, mitochondria. Structure and conformation of biophymers (nucleid acids and proteins). The nucleus, plastids, mitochondria. Structure and conformation of biophymers (nucleid acids and proteins). The nucleus, plastids, mitochondria. Cytoplasm. Endomembrane system: endoplasmic reticulum, the Golgi apparatus, lysosomes, vacuoles. Semiautonomic organelles: mitochondria. Sites of respiration and chloroplasts, sites of photosynthesis. The origin of eukaryotes: endosymbiotic hypothesis. Ribosomes. The cytoskeleton: microtubules, microtilaments. The cell cycle: mitotic (M) phase and interphase (G1, S and G2 phases). The division of cell nucleus - amitosis, mitosis, phases of mitosis, the mitotic spindle; meiosis. The cell division - cytokinesis. Cell differentiation. Cell death. Apoptosis and necrosis. Mendelian and modern genetics: structure, function and inheritance of genes. Includes the chemistry and structure of chromatin and chromosomes. Animal tissue histology. Animal cells and tissues. Human genetics: Chromosomal aberrations, genetic disorders and diseases. Genetic engineering. GMO organism.           F7ABBBLS         EiOlogical Signals         Z,ZK         4           In e subject deals with origins and description of the most important electric and non-electric biological signal		•			
biomaterials for photonics.         Display         Z,ZK         4           Basic information about the cellular level of organisms - from acelullar through prokaryotic to eukaryotic. The viruses. Prokaryotic cells. Bacteria. Bacterial diseases and their control.         Eukaryotic cells. Plant and animal cell structure and function. Structure and conformation of biopolymers (nucleid acids and proteins). The nucleus, plastids, mitochondria. Cytoplasm.           Endomembrane system: endoplasmic reticulum, the Golgi apparatus, lysosomes, vacuoles. Semiautonomic organelles: mitochondria, sites of respiration and chloroplasts, sites of photosynthesis. The origin of eukaryotes: endosymbiotic hypothesis. Ribosomes. The cytoskeleton: microtubules, microfilaments. The cell cycle: mitotic (M) phase and interphase (G1, S and G2 phases). The division of cell nucleus - amitosis, mitosis, phases of mitosis, the mitotic spindle; meiosis. The cell division - cytokinesis. Cell differentiation. Cell death. Apoptosis and necrosis. Mendelian and modern genetics: structure, function and inheritance of genes. Includes the chemistry and structure of chromatin and chromosomes. Animal tissue histology. Animal cells and tissues. Human genetics. Chromosomal aberrations, genetic disorders and diseases. Genetic engineering. GMO organism.           F7ABBBLS         Biological Signals         Z,ZK         4           The subject deals with origins and description of the most important electric and non-electric biological signals. The principles of generation, recording and basic properties are studied in all the signals. The studied signals involve native and evoked biosignal processing, spectrum analysis, modern methods of artificial intelligence, features extraction, autitoric classification, graphic presentation of results. Adaptive segmentation, art	-				
Basic information about the cellular level of organisms - from acelullar through prokaryotic to eukaryotic. The viruses. Prokaryotic cells. Bacteria. Bacterial diseases and their control. Eukaryotic cells. Plant and animal cell structure and function. Structure and conformation of biopolymers (nucleid acids and proteins). The nucleus, plastids, mitochondria. Cytoplasm. Endomembrane system: endoplasmic reticulum, the Golgi apparatus, lysosomes, vacuoles. Semiautonomic organelles: mitochondria, sites of respiration and chloroplasts, sites of photosynthesis. The origin of eukaryote: endosymbiotic hypothesis. Ribosomes. The cytoskeleton: microtubules, microfilaments. The cell cytic: mitotic (M) phase and interphase (G1, S and G2 phases). The division of cell nucleus - amitosis, phases of mitosis, the mitotic spindle; meiosis. The cell division - cytokinesis. Cell differentiation. Cell death. Apoptosis and necrosis. Mendelian and modern genetics: structure, function and inheritance of genes. Includes the chemistry and structure of chromatin and chromosomes. Animal tissue histology. Animal cells and tissues. Human genetics. Chromosomal aberrations, genetic disorders and diseases. Genetic engineering. GMO organisms.           F7ABBBLS         Biological Signals         Z,ZK         4           The subject deals with origins and description of the most important electric and non-electric biological signals. The principles of generation, recording and basic properties are studied signals from the gastro-intestinal system etc. Advanced methods of digital biosignal processing, spectrum analysis, modern methods of artificial intelligence, features extraction, automatic classification, graphic presentation of results. Adaptive segmentation, artificial neural networks for signal procesing.         Z         1           Basic safety regulations, training and examinations from the sections of the regulation No. 50/1978		biomaterials for photonics.	0.	•	
Eukaryotic cells. Plant and animal cell structure and function. Structure and conformation of biopolymers (nucleid acids and proteins). The nucleus, plastids, mitocchondria. Cytoplasm. Endomembrane system: endoplasmic reticulum, the Golgi apparatus, lysosomes, vacuoles. Semiautonomic organelles: mitocchondria, sites of respiration and chloroplasts, sites of photosynthesis. The origin of eukaryotes: endosymbiotic hypothesis. Ribosomes. The cytoskeleton: microtubules, microfilaments. The cell cycle: mitotic (M) phase and interphase (G1, S and G2 phases). The division of cell nucleus - amitosis, mitosis, phases of mitosis, the mitotic spindle; meiosis. The cell division - cytokinesis. Cell differentiation. Cell death. Apoptosis and necrosis. Mendelian and modern genetics: structure, function and inheritance of genes. Includes the chemistry and structure of chromatin and chromosomes. Animal tissue histology. Animal cells and tissues. Human genetics. Chromosomal aberrations, genetic disorders and diseases. Genetic engineering. GMO organisms. F7ABBBLS Biological Signals F7ABBBLS Call Biological Signals. The studied signals involve native and evoked biosignals, including biological signals of the heart, brain, muscles, nervous system, auditory signals, visual system, signals from the gastro-intestinal system etc. Advanced methods of digital biosignal processing, spectrum analysis, modern methods of artificial intelligence, features extraction, automatic classification, graphic presentation of results. Adaptive segmentation, artificial neural networks for signal processing. F7ABBBOZP Safety Regulations and Standards in Electrical Engineering Z 1 Basic safety regulations, training and examinations from the sections of the regulation No. 50/1978 Coll. and instructions concerning the laboratory experiments based on the electrical devices. Factors determining electrical shock injury. Symbols and labeling in electrotechnology - safety colors importance, safety geometrical shape important core, examples of the safety tables	F7ABBBLG	Biology	Z,ZK	4	
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	or ciccurcar shock.	Validity based on the electrotechnology qualification and directive "B". Lasers safety regulations.	, regulation NO. J	. 1010 000.	

F7ABBBP	Bachelor Thesis	Z	6			
	rojects at the end of bachelor studies. Topics are selected during the 5th term from a list. Bachelor thesis is defended at the end of the	-				
	part of the state exam. Bachelor thesis can be written and defended either Czech or English. Students are supervised by a tutor during	the above mention				
F7ABBCHM	Chemistry	Z,ZK	4			
Introduction to c	hemistry, categorization and properties of substances, chemical bonds, chemical reactions, elements in periodic table, organic chem	istry fundamentals	s, natural			
F7ABBDIZ	substances, polymers, analytical methods - instrumental analysis, chemical calculations, chemical equations	KZ	2			
	Detectors of Ionizing Radiation detectors, DC mode of IC, pulse mode of IC, proportional counters, pulse shape of proportional counter, neutron detection and spec	I I				
	e of Geiger-Mueller counters, corona counter, preliminary of the scintillation detectors, exploitation of organic (solid and/or liquid) sci					
	semiconductor detectors, Li compensated Ge detectors and HPGe detectors as photon detector.		,			
F7ABBEBI	Ethics in Biomedical Engineering	ZK	2			
	c ethical concepts and theories in the context of applied ethics with respect to the professional orientation, maintenance, and developm					
	Prerequisites and co-requisites: Knowledge of humanities in the scope of secondary school studies (basics of philosophy, history, psyc		-			
skills, abilities, and	competencies: Knowledge of basic concepts and controversial topics in theoretical and applied ethics, the ability to critically think, di	scuss, argue and c	defend their			
F7ABBELF	own views in ethical dilemma situations, developing the ability to work with literature, enhance empathy skills. Electrophysiology	Z.ZK	2			
	introduce students to the theory of electrical phenomena at the cell, organ and organism level, to the possibilities of measuring and organism level.	, , ,				
-	p enable students to experimentally verify the knowledge. This course builds on Anatomy and Physiology I and II and requires a basic	-				
	iction (physiology) of the following systems (excitable tissues): nervous, musculoskeletal, circulatory (especially the heart). The cours	-				
excitable tissues (	nervous, The course deals with the physiology of nervous tissue, muscle and glandular tissue and provides knowledge of the physiol	ogy of electrical pro	ocesses at			
	different levels: cell, tissue, organ, organism.					
F7ABBEM	Electrical Measurements	Z,ZK	4			
•	ric values, principles, using, and parameters. Analogue measuring converters. Electromechanical measuring devices. Current and po	•				
-	asuring. Electric work and electric power measuring: direct current, single-phase and three-phase current. Electrical resistance and im	-				
° °	ue scope. Digitalization, digital signal processing, signal reconstruction. Electronic measuring devices: multimeter, digital scope. Opto		•			
F7ABBEMP	Electromagnetic Fields of Living Organisms	KZ	2			
-	tic electric and magnetic fields, electromagnetic fields. Electrical and magnetic properties of biological tissues. Electrical, magnetic au mical and physiological bases of bioelectromagnetism. Bioelectric sources and conductive environment. Integral relations of electroc	-				
	ects of mathematical modeling of electrocardiography and electroencephalography. Topographic concept of bioelectrical and biomag					
,	and techniques of measurement. Human-robotic limb replacement interface.					
F7ABBEO	Electronic Circuits	Z,ZK	4			
The course provid	es a basic orientation in the principles of electronic circuits used in electronic laboratory and medical devices. It provides a prerequis	ite for the skilled of	peration of			
analogue and c	igital instrumentation. technology. Course entry requirements: Successful completion of Theoretical Electrical Engineering. Exit Know	vledge, Skills, Abilit	ties and			
Competencies: S	Students will become familiar with functional electronic blocks that are used in the design of laboratory and medical instruments. The	course will prepare	e them to			
	competently assess the basic properties and parameters of electronic devices.					
F7ABBESP	Management of Health Care Technology	Z,ZK	2			
F7ABBEZP	Economics of Health Services	KZ	2			
	health care facility economics (hospitals, public and private health care facility) as: facility effectiveness, costs and income, financial ng etc. Specifics of health care facilities. Integral view of functioning of health care companies view on health care "company". Develo	-				
nealth care market	in the field of financial management tools.	prinerit of knowledg	je anu skilis			
F7ABBFCH	Physical Chemistry	Z.ZK	4			
	mical properties of substances. Basic calculations. Principles and behavior of systems of gases and liquids. Chemical bonds. Proper	, , ,				
-	stances. Phase equilibria, multiface systems. Behavior and properties of vapors, evaporation. Electrochemical potential, electrodes.		-			
kind. Referent and	ndication electrodes, electrodes for EKG, EEG, EMG etc. Redox potential. Inert electrodes. Membranes - types, properties and appli	cations. Osmotic pr	ressure. Ion			
	s. Acidity and basicity of solutions, pH. pH measurement. Stability of materials, corrosion. Passivation and self-passivation. Electrolysi					
	nts. Polarography. Further methods of analysis of gases and solutions in BME (Biomedical Engineering.) Optical absorption. Spectro					
pnospnorescence.	Sensors for measuring of pH, pO2, pCO2, and SaO2 working on the basis of fibre optic cables and absorption or fluorescence. Adva	nced analytical dev	VICES. Mass			
F7ABBFVP	spectroscopy, nuclear magnetic resonance, flame spectroscopy. Thermodynamics of reaction systems, basic calculations.	KZ	2			
F7ABBFY1	Multivariable Calculus	Z,ZK	4			
	Physics I. used to repeat and expand the basic knowledge of physics in the field of classical mechanics, thermals and optics, which is needed f					
	Students will gain theoretical knowledge, the ability to solve numerical problems and practical skills associated with working in laboration of the solution o		DIVIL 010.			
F7ABBFY2	Physics II.	Z,ZK	6			
	2 follows the course Physics 1 and expands the acquired knowledge in the field of electromagnetism and the basics of atomic and n					
	matter physics.					
F7ABBHE	Hygiene and Epidemiology	ZK	1			
	earn theoretical basics of Epidemiology and Hygiene disciplines in depth covered by lecture topics. As result of this subject, student s		-			
•	thods used in all disciplines of infectious and non-infectious epidemiology, environmental epidemiology and in solving of priorities and		ic Health			
	ection. Outcoming knowledge, skills, abilities and competences: Knowledge of basic methods used in preventive medical disciplines		4			
F7ABBISZ	Information Systems in Health Care	Z,ZK	4			
	ted on medical informatics definition and basic characteristic of the different specialized areas. The relations between IS and health alyzed as well. Some basic information technology, HW and SW tools are described in relation to IS design. A special attention is pai		-			
-	interpretation, data and communication standards. Different types and features of clinical and hospital IS, decision support systems and regional health care IS are analyzed and					
			,			
	discussed. Methodology of IS development, implementation and support are presented as well.					
F7ABBITP			4			
F7ABBITP The subject is an in	discussed. Methodology of IS development, implementation and support are presented as well.	Z,ZK				
The subject is an in and by substitution.	discussed. Methodology of IS development, implementation and support are presented as well. Integral Calculus troduction to integral calculus and integral transforms. Integral calculus: anti-derivative, indefinite integral, properties and methods of in partial fractions), definite integral, properties, Newton-Leibnitz fundamental theorem, simple applications of both indefinite and definite	Z,ZK ntegration (integrati ite integrals, improp	ion by parts per integral,			
The subject is an in and by substitution, solving differential	discussed. Methodology of IS development, implementation and support are presented as well. Integral Calculus troduction to integral calculus and integral transforms. Integral calculus: anti-derivative, indefinite integral, properties and methods of in partial fractions), definite integral, properties, Newton-Leibnitz fundamental theorem, simple applications of both indefinite and defin equations (ODEs) (1st order ODEs with separable variables, linear 1st order homogenous as well as non-homogenous ODEs, 2nd of the second se	Z,ZK ntegration (integrati ite integrals, improp order linear homog	ion by parts per integral, enous and			
The subject is an in and by substitution, solving differential	discussed. Methodology of IS development, implementation and support are presented as well. Integral Calculus troduction to integral calculus and integral transforms. Integral calculus: anti-derivative, indefinite integral, properties and methods of in partial fractions), definite integral, properties, Newton-Leibnitz fundamental theorem, simple applications of both indefinite and definite	Z,ZK ntegration (integrati ite integrals, improp order linear homog	ion by parts per integral, enous and			

	Communication Technology	Z,ZK	2
	rse is to teach the student to understand the basic principles of the function of personal computers, their peripherals and communicati	I ' I	
to co	onfigure the network interface and configure and connect a peripheral type of a standard medical devices equipped with a wired or wi	reless interface.	
F7ABBKZS	Conventional Imaging Systems	Z,ZK	4
Electromagnetic	radiation spectrum and relationship to the modalities of medical diagnostic imaging systems. Fundamentals of imaging theory. Applic	ation of 2D FT. Trai	nsmission
properties of in	naging systems. Optical imaging systems including microscopic. Television imaging systems (including video endoscopic imaging systems)	stems). Basic digita	l image
pre-processing m	ethods. Infrared imaging systems (thermal imaging/IR imaging systems). X-ray imaging systems. Gamma imaging systems. Lectures	and especially the	laboratory
-	students with an overview of the principles of image formation in medicine for conventional imaging systems and methods. There are		-
	zation and subsequent processing and principles of function and properties of sensing image devices in context, which is especially rel		
•	e whole course and study specialization. Knowledge, skills and competences: The student is able to explain the basic physical princip	0	
-	ncluding the principle of image formation. The student is able to assess, on the basis of standard definition of technical parameters the		
physician requirer	nents for selected modality. Such knowledge is a prerequisite to the correct process technology selection and application of the moda necessary to ensure the required quality of the resulting image data.	annes as wen as the	eminimum
F7ABBLAD	Linear Algebra and Differential Calculus	Z,ZK	6
	troduction to differential calculus and linear algebra. Differential calculus - sets of numbers, sequences of real numbers, real functions		
	ivative of a function investigation of function behavior), Taylor's formula, real number series. Linear algebra - vector spaces, matrices		
containing and act	linear algebraic equations (solvability and solution), eigenvalues and eigenvectors of matrices, applications.		
F7ABBLPZ1	Medical Devices and Equipment I. (Diagnostic Devices)	Z,ZK	4
	categories. Electrical safety of medical devices. Biopotentials amplifiers. Electrocardiographs, electromyographs and electroencephal		-
	diac output measurement. Blood pressure measurement. Cardiac frequency measurement. Phonocardiography. Pulse oximetry. Medic		
	and electrosurgery medical devices. Therapeutic medical devices. Implantable medical devices. Telemetry. Medical devices for au		
F7ABBLPZ2	Medical Devices and Equipment II. (Therapeutical Devices)	Z,ZK	2
	tegories. The electrical safety of therapeutical medical devices. Artificial ventilation, introduction. Conventional ventilation. High-freque		racorporeal
membrane oxyger	ation. Hemodialysis. Drug infusion pumps (volumetric, syringe). Artificial cardiac pacemaker. Defibrillators (external, implantable). Co	chlear implant. Ele	ctrosurgery
	units. Therapeutic ultrasound. Electro-therapy. Magneto-therapy.		
F7ABBLT	Clinical Laboratory Instrumentation	Z,ZK	4
Clinical laborato	ry instrumentation introduces principles of bioanalytical methods used in clinical diagnostics. Emphasis is put on optical methods (UN	/-VIS spectrophoto	metry, IR
1 120	AS, AES, fluorimetry), NMR and X-ray analysis, electrochemical and electromigration methods (ion electrodes, biosensors, electroph	,	0,,
imunoassays and	genetic methods (ELISA, PCR) as well as on chromatography and mass spectrometry. Contribution of lab automation to clinical diag		discussed.
	During the laboratory course students will be introduced into the basics of work in bioanalytical laboratory and lab data proces	-	
F7ABBMAT	Marketing of Medical Technology	KZ	2
-	nentals, products management, basic knowledge concerning export activities in the field of marketing and commercial health care ter		cases are
	nted including health care technology companies from the Czech Republic. Discussion and analysis of the real products are included		
F7ABBMAZ	Management and Admininistration in Health Care v the structure of the health sector and financing models Health. Zoom administrative management issues various types of medical w		1
Getting to know	interconnection. Orientation in the specific features of health facilities and European systems of health care workplaces.	orkplaces, their he	Cessary
F7ABBMDT	Microwave Diagnostics and Therapy	KZ	2
	EM field with biological tissues and its use in diagnostics and therapy. Numerical methods suitable for modeling these interactions. E	I I	
(MWI). Perspecti	ve application of microwave techniques in medical diagnostics: non-invasive monitoring of blood glucose concentration, microwave d	etection and classif	fication of
· / ·	verapplication of microwave techniques in medical diagnostics, non-invasive monitoring of blood glucose concentration, microwave diverse and RF local and regional hypertherm		
· / ·			
cerebral vascular e	vents and early detection of breast cancer. Therapeutic systems and applicators for microwave and RF local and regional hypertherm and testing of applicators. Mechanics	ia. Planning treatm	ent. Design
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F7ABBMVP	Research Methodology	KZ	2
The course introc	luces students to the basic methods of research work and the requirements for scientific communication. The course also introduces writing and presenting of bachelor's thesis.	students to the pri	nciples of
F7ABBNMP	Project Proposal and Management	KZ	2
As part of the lect	ures, students will become familiar with topics such as project management (PM) according to IPMA, the certification process, project	ct, program, portfoli	o, phases,
	e cycle, as well as project initiation. They will learn about the feasibility study, project initiation, project identification document, and log	-	-
	ction to project planning, scheduling, risk and risk analysis, project implementation, behavioral competencies in PM, project closure,		
	nsights from a hospital environment. During the exercises, students will master the following concepts and topics and develop relevant	-	-
	document, logical framework, WBS (Work Breakdown Structure a hierarchical structure of tasks or activities), scheduling, risk analysi rt of this course, students have the opportunity to obtain the IPMA Level D certification, which is intended for aspiring project manage		
	team members. The certification is valid for five years.		ators, and
F7ABBOIZ	Protection Against Ionizing Radiation	ZK	2
	irse is to give students an overview of the issues of protection against ionizing radiation and dosimetry in general and in a specialize		
	ies of basic types of ionizing radiation, sources of ionizing radiation, interaction of gamma radiation with matter, interaction of charge		
	passage through the matter, units used in dosimetry and radiation protection, operational units for working and environment monitorin	•	•
contamination, shie	Iding of simple sources. Special attention is paid to the exposure control of workers, residents and patients. In course students will give	e invormation abou	t legislative
interpretation of do	sage limits. Entry requirements of the course: Structure of matter, basic types of nuclear transformations. Properties of basic types o	f ionizing radiation,	sources of
e e	nteraction of gamma radiation with matter, interaction of charged particles with matter, passage of photon and electron beams throug		•
	owledge, skills, abilities and competences: Units used in dosimetry and radiation protection. Principles and goals of radiation protection		-
against external id	pnizing radiation and protection against internal contamination. Dose limitation system, ionizing radiation in legislation of Czech Repu	ublic. Ionizing radiat	tion use in
	healthcare.		
F7ABBPMS	Probability and Mathematical Statistics	Z,ZK	4
-	liarize students with the basic principles of the theory of probability and mathematical statistics. Pre-requisites and entry requirement		-
	ear algebra, differential and integral calculus) in the range of F7PBBLAD and F7PBBITP courses taught in the first year of study. Know		
	student is acquainted with the probabilistic model, basic definitions of Kolmogorov theory of probability and inductive statistics. The stuc is that arise in other areas of professional work and can explain them sufficiently (e.g. doctors). The student is familiar with the basic		
	and can choose a suitable method for standard statistical problems.		
F7ABBPNK	Design and Construction of Medical Devices/Practical Exercises	KZ	4
1	actically oriented course is to acquaint students with the design process of the measuring part of the device, ie basic problem analysi	I ·· I	-
	esign, selection of suitable components and their values with emphasis on working with catalog sheets and application recommendation		
	board design. printed circuit board, its mounting, soldering and revitalization. During the course, students will implement a functional		
	c thermometer, which will consist of two functional units - analog part for temperature measurement and signal conditioning (equipped		-
display element wit	h diode bargraph (equipped with SMT components ). For both products, students will implement the design of the diagram and PCB in	the CAD environme	ent EAGLE.
In addition to the an	alog part of the device, an application for digitizing data from the analog device using NI-DAQ cards and a cheap solution with the help of	of Arduino will be im	plemented.
TI	ne last part will be a service intervention in the device (monitor of vital functions) with emphasis on safe handling and measurement of	of test points.	
F7ABBPP	First Aid	KZ	2
-	brief overview of the main principles and procedures of providing emergency first aid with special attention to the procedures for fail		
	ning situations. The subject also includes situations of mass casualty of victims in crisis situations and emergencies, including the ph		:N.
F7ABBPPM1	Programming in Matlab I.	KZ	1
I ne aim of the co	urse is to acquaint students with the Matlab environment and language. Students will learn how to create functions and scripts in Ma about data structures and work with data and their vizualization. The course is followed by the course Programming in Matlah		will learn
F7ABBPPM2	Programming in Matlab II.	KZ	2
	he students will consolidate and widen their previous knowledge with the Matlab environment, programming language and with basic	I I	_
u u	course Programming in Matlab I. The students will learn how to create functions and scripts in Matlab, how to manipulate and visual		•
	the basic toolboxes. As well the students will learn to create basic user interfaces.		
F7ABBPPP	Programming Tools	KZ	2
	tware tools on MS Windows platform and GNU/Linux platform. Short introduction of several software tools (MS Word, Excel, LateX, F	I I	
	languages (Python, R, Java, CSS, bash) .	. , .	0 0
F7ABBPPS	Patient and Device Simulators and Testers	Z,ZK	2
	nent simulators and testers. Basic principles of implementation, connections with other disciplines. Detailed description and impleme		
a subsystem. Desig	n and implementation of patient and instrument simulator sub-blocks. Examples of circuit implementations of simulators and testers. E	Environment, scena	rio creation
and other related	procedures in manikin control, basic concepts and principles of anesthesiology. Other types of simulators and phantoms. Possibilitie	es of use in clinical	practice.
Practical demons	tration. Connection of the simulator with other medical equipment. Simulators and testers. Implementation of an established simulation	on scenario, scenar	io testing,
	creation of new scenarios. Collaboration between HPS and anaesthesia machine.		
F7ABBPSL	Psychology	KZ	2
	odology and methods of psychology. Mental activities and psychic processes, psychology of personality, objects of psychology and the		
	r; its concept and theory, psychic processes and stages. Psychological interpretation of personality. Application of knowledge in medic		
	redical doctors, technicians and patients, technicians and nurses. Communication as a tool for good cooperation amongst people and		
expression and	communication skills. Use of elocution and gestures in personal expression. Verbal and nonverbal communication. Dialogue; types of dialogue. Model situations. Communication process as part of economics - components, tools and functions.	dialogue, question	is during
F7ABBPTI	Principles and Practice in Tissue Engineering	KZ	2
F7ABBRBL		KZ	
	Robotics in Medicine	Z	2
F7ABBROP Familiarization of	Guided Practical Training students with the organization and provision of professional internships at the clinical workplace. Provision of contractual documents	I – I	
	professional practice). The ROP will then enable the acquired practical skills and habits to be applied in the key subjects of the 3rd y		
	urrent technical level of hospital equipment; an overview of the organization of the work of biomedical technicians and engineers; car		
	ensure the safe operation of medical equipment. He can communicate with technicians, but also medical staff. He is able to work in		
F7ABBSBP	Bachelor Thesis Seminar	Z	1
	aim of the course is to accentuate the realized outcomes of the projects solved in the 4th, 5th and 6th semesters of the Biomedical Te	I I	
	aim of the course is also to prepare students for the defense of their bachelor thesis infront of the final state examination committee.		-
Prerequisite F7PBB	MVP Exit Knowledge, Skills, Abilities and Competencies: Students are fully aware of the requirements for the requirements of professional	al reports and comm	nunications,

they are proficient in the orientation in the professional literature. The students are able to understand the literature and literature on a given topic, apply scientific research methods to specific assignments. They present their proposed solutions and results, are able to interpret the results. F7ABBSEL **Power Engineering** Z.ZK 5 Basics of power electronics, power supplies, including electrochemical sources, rectifiers, stabilizers, the most commonly used types of motors, basics of power distribution, types of electrical systems and connecting appliances with a focus on medical use. Emphasis is placed primarily on the physical nature of the problem and its understanding. knowledge will be verified on practical examples and in the laboratory. F7ABBSJ Scripting Languages K7 2 The aim of the course is to understand the topic of scripting languages and their applications, to understand their advantages and disadvantages and their complementarity with system languages. Students will become familiar with regular expressions and tools for word processing. The course focuses on the scripting languages within the Unix operating system and the scripting languages Python. F7ABBSM Sensors in Medicine Z.ZK 4 This subject provides information about basic electronic devices - sensors, describes their operation principle, basic circuit configuration and application. The stress is aid mainly on clarifying of basic principles and practical utilization. Integral part of this course is basic information about sensors of non-electric quantities and their read-out circuits eg. strain related sensors (force, pressure, torque, vibration, displacement, acceleration etc.) magnetic field sensors, temperature sensors, chemical sensors, optical sensors and biosensors. The stress is aid on miniaturization, integration F7ABBSPR1 Semestral Project I. K7 1 The topic of the semester project (SPR1) must be in the field of biomedical engineering and must be related to the study field of the same name Biomedical Technician. The topics are available for the relevant academic year in the database projects.fbmi.cvut.cz Note: It is not possible to implement economic-managerial topics, topics based mainly on the creation of research, clean programming, topics purely in the field of biology, etc. The application must always be part of the work in accordance with the focus of the field. The topic must always be related to technology (medical devices, or the scope of work of a Biomedical Technician in clinical practice)! Entries that do not fall into the above areas will not be approved. Semestral Project II. F7ABBSPR2 K7 4 The main idea is to start work on a project which can be improved in time and finish as a Bachelor thesis. In the course will be discussed topic as basic communication and presentation skills, including teamwork and project management. Creation of presentations and written texts. Typography rules. Types, purpose and requirements of technical presentations and technical texts. Writing a commented bibliographic search. The student solves topic (project) from the selection of the PROJECTS database - http://projects.fbmi.cvut.cz During the term, there are dedicated 2 hours every week for work under teacher supervising. F7ABBSPT Equipment for Anaesthesiology and Resuscitation Z,ZK 4 The main objective of the course is to introduce students to the basic equipment of intensive care units (ICU) and anesthesiology and resuscitation departments of hospitals. These are devices to support vital functions, especially lung ventilation, as well as patient monitors, anesthesia machines and their parts and other equipment. Another objective of the course is to integrate knowledge and skills of students from the fields of science (especially physics, chemistry and physiology) and engineering (modeling, circuit theory, pneumatic elements, etc.) in the analysis of clinical technology and in the design and implementation of functional technical systems. Technical Audiology F7ABBTA ΚZ 2 The aim of the course is to give students a basic overview of audiology, i.e. basic knowledge of biology, medicine and technology in relation to normal and impaired hearing, and all this in an interrelated context with emphasis on technical aspects. Motivation to work in clinical practice in audiology is also an integral part of this goal. workplace. Course entry requirements: These requirements are expressed as prerequisites and a detailed breakdown of the requirements is as follows: - nervous system - organisation and function of the CNS, internal environment of the CNS (blood-brain barrier, cerebrospinal formation, transport and function), neuroglia, motor nervous system, spinal cord (structure, reflexes), - nervous system - motor system, brainstem (structure, reflexes), cerebellum (structure, reflexes), basal ganglia (structure, reflexes), cerebral cortex (structure, rexlexes), physiology of movement control, - sensory nervous system - receptors, skin sensation, movement and position perception, vision, hearing, taste, smell, pain, autonomic nervous system, brain stem, hypothalamus, peripheral compartments: sympathetic and parasympathetic, - waves, types of waves, successive waves, interference, standing waves, sound, - types of signals, basic signal operations, signal decomposition, - harmonic analysis, Fourier transform for continuous and discrete signals, DFT, FFT, - convolution, - technical and biological systems, systems and their description, linear and non-linear system, - external description of continuous and discrete linear system - differential/differential equations, transfer functions, frequency characteristics, distribution of zeros and poles, time characteristics, - coupling of systems, feedback loops, - Characteristics of basic biosignals EEG, ECG, EOG, EP, EMG, artefacts, origin, sources, diagnostic applications, frequency range and bands, - Biological data acquisition and preprocessing, basic computer conversion chain, A/D converters, problems signal sampling and quantization, Nyquist theorem, conversion errors, signal conditioning, aliasing, filtering, trends, sensing options. Output knowledge, skills, abilities and competences: Students will acquire a basic understanding of acoustics, measurement and diagnosis of auditory functions, including technical principles. instrumentation and software, and hearing aids and replacements. The students will be able to orient themselves. They will be able to learn about these issues, learn about other areas of medical instrumentation and methods used in clinical practice, as well as motivated and ready to enter the field of audiology upon graduation and to add to this knowledge and advanced skills within the framework of the so-called certified course, which, according to Act 96/2004 Coll., allows for the acquisition of the so-called "certificate of audiology". Special professional competence Technical audiologist after graduation, i.e. after obtaining the so-called professional competence Biomedical technician under the Act. F7ABBTEL Theory of Electrical Engineering Z,ZK 4 Electric current, DC and AC currents. Electrical curcuits including R, L, C. Power of electric current, thermal effect of electric current. Distribution of electrical energy. Connection of the electrical systems. Input resistance and impedance, idle voltage, inner resistance and impedance of the source, mutual loading of the source and electrical appliance, impedance matching. Properties of circuits in time and frequency domain. Transient action in DC circuits, frequency characteristics of the L/C circuit. Electrical current in semiconductor, type of the conductivity, creation of the semiconductor crossing, properties in the forward and reverse direction. Bipolar transistor - transistor effect, basic principle in elementary circuit. Unipolar transistor. Unipolar transistors with complementary vodivosti (CMOS). Electromagnetic effects (induction, magnetization, force effect). Electromagnetic wave, spreading, interference, electromagnetic compatibility. Soft and hard magnetic materials. Transformers construction and parameters. Magnetic recording and reproduction of signals. Electromotors principles. F7ABBTZS Tomographical Imaging Systems CT systems (basic principle, schematic arrangement system, basic physical principle, developmental generations, basic principles of reconstruction). Imaging systems magnetic resonance. PET and SPECT principle. Specialized imaging systems (hybride). Ultrasound imaging systems. Doppler systems. Subject and especially laboratory exercises provide students with an insight into the principles of creating image data used in medicine, the principle of methods their scanning, digitization and subsequent processing, on the principle of function and properties of scanning image means in context, which is important especially in terms of interdisciplinarity of the subject and the field as a whole F7ABBUSS Introduction to Signals and Systems Z,ZK 4 To introduce students to basics of theory of signals and systems. To explain main principles on applications from biology and medicine. To become acquainted with basic mutual relations in computer laboratories by means of MATLAB. F7ABBVBI K7 2 Virtual Bioinstrumentation This subject deals with process of development of application in LabVIEW using Virtual Instrumentation concept. During the course will be explained basic concepts of programming like variables, data structures, cluster, loops, conditionals, typedefs, advanced coding concepts like event driven programming, multi-threaded application development, data queues and FIFOs, synchronisation, process of deployment, executable building, installer and upgrades. The students are able also to obtain the CLAD (Certificate LabVIEW Associate Developer) certificate. This certificate is first step in knowledge of VI. F7ABB7LN Legislation in Health Care and Technical Standards K7 2 Aims / aims: The aim of the course Legislation in Health Care and Technical Standards is to teach students the basic requirements and regulatory obligations in healthcare, especially in the field of medical devices. During the course, students will learn the basics of legislation process, as well as regulation related to the medical devices, lso with legislative regulations in the field of clinical trials and the operation of medical devices. Furthermore, students will learn the legal context of providing health care. The aim is to acquaint students with the

rights and obligations arising from current legislation relating to health care issues. The emphasis is not on memorizing of the text of legal regulations, but on acquainting students with

the main points and ideas contained in the laws, regulations and standards of the Czech Republic and EU directives in the field of healthcare. Prerequisites and co-requisites: To successfully complete the course, students should know the basics of the principles of medical devices due to the practical application of legislation in this area. Output knowledge, skills, abilities and competences: After completing the course, the student should have a comprehensive overview of health legislation. He should be able to orientate himself in a given problem related to legislation without any problems and he should know where he can find individual details related to legal issues in health care.

F7ABBZOD	Image Data Processing	KZ	2	
Continuous image	solution, noise, loc	ok up tables,		
histogram, Discr	ete Fourier transform, discrete cosine transform, image enhancement, geometric operations, image filtering, morphological operation	s, image restoration	on, image	
	segmentation, basic principles of image compression.			
F7ABBZP	Fundamentals of Pathology	ZK	2	
The main goal of the course is represented by continuous enlargement of anatomical, physiological and multi-disciplinary consequences in human health and disease. At the very				
beginning of the course the fundamentals of cell structure disorders and metabolic paths disturbances are provided to understand pathology of organ systems and complexity of disease				
origin and causes. The course provides a wide overview of morphological and functional conditions in pathology. The knowledge is then simply transformable to clinical and technical				
disciplines used in examination and health monitoring of the patients. The Course Requirements: The enrolment to the course is contingent on successful finishing of the course Anytomy				

and Physiology II. Release and Results: The students obtain basic outline of pathological processes in the human body. Their skills comprise definition of disease, comprehension and

description of pathological changes in organs and body structure. The theoretical basis of the course is oriented to use in technical branches of biomedical engineering. For updated information see <u>http://bilakniha.cvut.cz/en/FF.html</u>

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