### 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: F7PBB 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 group	J.					
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, <b>authors</b> and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
F7PBBALP	Algorithmic and Programming Theory Pavel Smr ka, Tomáš Veselý, Lenka Hanáková, Christiane Malá Pavel Smr ka Pavel Smr ka (Gar.)	ΚZ	4	2P+2C	z	Z
F7PBBAF1	Anatomy and Physiology I. Roman Má alík, Jakub Tlapák Jakub Tlapák (Gar.)	Z,ZK	4	2P+1C+1L	Z	Z
F7PBBAF2	Anatomy and Physiology II. Jakub Tlapák <b>Jakub Tlapák</b> Jakub Tlapák (Gar.)	Z,ZK	4	2P+1C+1L	. L	Z
F7PBBA3A	English Language IIIA (part 1) Eva Moty ková Eva Moty ková Eva Moty ková (Gar.)	KZ	2	2C	Z	Z
F7PBBA3B	English Language IIIB (part 2) Eva Moty ková Eva Moty ková Eva Moty ková (Gar.)	KZ	2	2C	L	Z
F7PBBBP	Bachelor Thesis Jií Hozman <b>Jií Hozman</b> Jií Hozman (Gar.)	Z	6	8C	L	Z
17BOZP	Occupational Safety and Health, Fire Protection and First Aid Petr Kudrna Petr Kudrna Petr Kudrna (Gar.)	Z	0	1P	Z	Z
F7PBBBCH	Biochemistry Martina Turchichová, Anna Ludvíková, Kate ina Dunovská Anna Ludvíková Martina Turchichová (Gar.)	Z,ZK	2	1P+1L	z	Z
F7PBBBLS	Biological Signals Marek Piorecký, Václava Piorecká Václava Piorecká (Gar.)	Z,ZK	4	2P+2L	L	Z
F7PBBBLG	Biology Veronika Vym talová, Aneta Buchtelová Veronika Vym talová Veronika Vym talová (Gar.)	Z,ZK	4	2P+2L	Z	Z
F7PBBBB	Biomechanics and Biomaterials Matej Daniel Petr Volf Matej Daniel (Gar.)	Z,ZK	4	2P+2L	Z	Z
F7PBBBOZP	Safety Regulations and Standards in Electrical Engineering Petr Kudrna, Jan Remsa Petr Kudrna Petr Kudrna (Gar.)	Z	1	1P	Z	Z
F7PBBCHM	Chemistry Iveta Horá ková, Miriam Hošková Iveta Horá ková Miriam Hošková(Gar.)	Z,ZK	4	2P+1C+1L	. L	Z
F7PBBEM	Electrical Measurements Roman Mat jka, Jan Vrba Jan Vrba Jan Vrba (Gar.)	Z,ZK	4	2P+2C	Z	Z
F7PBBELF	Electrophysiology Anastasia Sedova, Ksenia Sedova, Pavel Ku era Anastasia Sedova Ksenia Sedova (Gar.)	Z,ZK	2	1P+1L	z	Z
F7PBBEO	Electronic Circuits Jan Uhlí <b>Tomáš D íž al</b> Jan Uhlí (Gar.)	Z,ZK	4	2P+2C	Z	Z

F7PBBEBI	Ethics in Biomedical Engineering Martina Dingová Šliková Martina Dingová Šliková Martina Dingová Šliková (Gar.)	ZK	2	2P	L	Z
F7PBBESP	Management of Health Care Technology Ji í Petrá ek Ji í Petrá ek Ji í Petrá ek (Gar.)	Z,ZK	2	1P+1C	L	Z
F7PBBFY1	Physics I. Jan Mikšovský, Eva Urbánková, Petr Písa ík Petr Písa ík Jan Mikšovský (Gar.)	Z,ZK	4	2P+1C+1L	Z	Z
F7PBBFY2	Physics II. Jan Mikšovský, Eva Urbánková, Petr Písa ík, Jana Urzová Petr Písa ík Jan Mikšovský (Gar.)	Z,ZK	6	2P+2C+2L	L	Z
F7PBBFCH	Physical Chemistry Karel Roubík, Martina Turchichová, lveta Horá ková lveta Horá ková Karel Roubík (Gar.)	Z,ZK	4	2P+1C+1L	Z	Z
F7PBBHE	Hygiene and Epidemiology Lucie Lidická, Emil Pavlík Lucie Lidická Emil Pavlík (Gar.)	ZK	1	1P	L	Z
F7PBBISZ	Information Systems in Health Care Zoltán Szabó, Dagmar Brechlerová, David Jirsa, Anna Hor áková, Petr Šmíd, Tomáš Kraj a Anna Hor áková Zoltán Szabó (Gar.)	Z,ZK	4	2P+2C	Z	Z
F7PBBITP	Integral Calculus Ji í Neustupa, Tomáš Parkman Tomáš Parkman (Gar.)	Z,ZK	4	2P+2C	L	Z
F7PBBKT	<b>Communication Technology</b> Tomáš Veselý, Aneta Buchtelová, Karel Hána, Tomáš Funda, Martin Vít zník, Markéta Janatová, Kate ina Pilátová <b>Tomáš Funda</b> Karel Hána (Gar.)	Z,ZK	2	1P+1C	Z	Z
F7PBBKZS	Conventional Imaging Systems Ji í Hozman, Tomáš D íž al, Martin Rožánek, Martin apek Tomáš D íž al Ji í Hozman (Gar.)	Z,ZK	4	2P+1C+1L	L	Z
F7PBBLT	Clinical Laboratory Instrumentation Martina Turchichová Martina Turchichová (Gar.)	Z,ZK	4	2P+2L	L	Z
F7PBBLPZ1	Management of Health Care Technology Petr Kudrna, Martin Rožánek Petr Kudrna Martin Rožánek (Gar.)	Z,ZK	4	2P+2L	Z	Z
F7PBBLPZ2	Medical Devices and Equipment II. (Therapeutical Devices) Petr Kudrna, Václav Ort, Karel Roubík Petr Kudrna Petr Kudrna (Gar.)	Z,ZK	2	1P+1L	L	Z
F7PBBLAD	Linear Algebra and Differential Calculus Jana Urzová, Ji í Neustupa, Tomáš Parkman, Lukáš Liebzeit <b>Tomáš Parkman</b> Tomáš Parkman (Gar.)	Z,ZK	6	2P+4C	Z	z
F7PBBMAZ	Management and Admininistration in Health Care	KZ	1	1P	Z	Z
F7PBBMEC	Mechanics Matej Daniel Matej Daniel (Gar.)	Z,ZK	4	2P+2L	L	Z
F7PBBMT	Medical Terminology Dana Rebeka Ralbovská Dana Rebeka Ralbovská Dana Rebeka Ralbovská (Gar.)	Z	1	1C	Z	Z
F7PBBMVP	Research Methodology Jakub Ráfi, Marek Novák <b>Jakub Ráfi</b> Jakub Ráfi (Gar.)	KZ	2	1P+1C	Z	Z
F7PBBMS	Modelling and Simulation Jan Kauler Jan Kauler Jan Kauler (Gar.)	Z,ZK	4	2P+2C	L	Z
F7PBBNMP	Project Proposal and Management Ji í Petrá ek, Pavlína Pokošová <b>Ji í Petrá ek</b> Ji í Petrá ek (Gar.)	ΚZ	2	1P+1C	L	Z
F7PBBOIZ	Protection Against Ionizing Radiation František Podzimek František Podzimek František Podzimek (Gar.)	ZK	2	2P	L	Z
F7PBBPPS	Pacient and Device Simulators and Testers Petr Kudrna, Martin Rožánek, Lenka Horáková Petr Kudrna Petr Kudrna (Gar.)	Z,ZK	2	1P+1L	Z	Z
F7PBBPPM1	Programming in Matlab I. Christiane Malá, Radim Krupi ka, Lucie Horáková Radim Krupi ka Radim Krupi ka (Gar.)	ΚZ	1	1C	Z	Z
F7PBBPPM2	Programming in Matlab II. Christiane Malá, Adéla Mádlová Radim Krupi ka Radim Krupi ka (Gar.)	ΚZ	2	2C	L	Z
F7PBBPNK	Design and Construction of Medical Devices/Practical Exercises Roman Mat jka, Jana Mat jková Roman Mat jka Roman Mat jka (Gar.)	КZ	4	4L	Z	z
F7PBBPMS	Probability and Mathematical Statistics Marek Piorecký, Jan Štrobl, Michaela Mrázková, Tomáš Nagy Michaela Mrázková Marek Piorecký (Gar.)	Z,ZK	4	2P+2C	Z	Z
F7PBBPP	First Aid Pavel Böhm Pavel Böhm	ΚZ	2	1P+1C	L	Z
F7PBBPSL	<b>Psychology</b> Jaroslava Jirásková, Martina Kusáková <b>Jaroslava Jirásková</b> Martina Kusáková (Gar.)	ΚZ	2	1P+1C	Z	Z
F7PBBROP	Guided Practical Training Petr Kudrna Petr Kudrna (Gar.)	Z	2	80XH	L	Z
F7PBBSPR1	Semestral Project I. Petr Kudrna, Marek Piorecký Petr Kudrna Petr Kudrna (Gar.)	KZ	1	1C	L	Z
F7PBBSPR2	Semestral Project II. Petr Kudrna Petr Kudrna (Gar.)	KZ	4	4C	Z	Z
F7PBBSBP	Bachelor Thesis Seminar Ji í Hozman <b>Ji í Hozman</b> Ji í Hozman (Gar.)	Z	1	1C	L	Z

F7PBBSM	Sensors in Medicine David Vrba, Miroslav Husák David Vrba Miroslav Husák (Gar.)	Z,ZK	4	2P+2L	L	z
F7PBBSEL	Power Engineering Ji í Hozman, David Vrba, Ji í Petrá ek David Vrba David Vrba (Gar.)	Z,ZK	5	2P+3L	L	z
F7PBBSPT	Research Methodology Václav Ort, Karel Roubík, Jakub Ráfl, Šimon Walzel Jakub Ráfl Václav Ort (Gar.)	Z,ZK	4	2P+2L	L	Z
F7PBBTEL	Theory of Electrical Engineering Tomáš D íž al, Jan Uhlí, Marek Novák, Pavel Máša Tomáš D íž al Jan Uhlí (Gar.)	Z,ZK	4	2P+2C	L	z
F7PBBTZS	Tomographical Imaging Systems Ji í Hozman, Tomáš D íž al, Martin Rožánek, Evgeniia Karnoub Martin Rožánek Ji í Hozman (Gar.)	Z,ZK	4	2P+1C+1L	Z	z
F7PBBUSS	Introduction to Signals and Systems Jan Kauler Jan Kauler Jan Kauler (Gar.)	Z,ZK	4	2P+2C	Z	Z
F7PBBZP	Basics of Pathology Miloš Sokol <b>Miloš Sokol</b> Miloš Sokol (Gar.)	ZK	2	2P	L	z
F7PBBZLN	Legislation in Health Care and Technical Standards Peter Kneppo, Vojt ch Kamenský, Ond ej Gajdoš Vojt ch Kamenský Peter Kneppo (Gar.)	KZ	2	1P+1C	Z	Z
Characteristics of the	courses of this group of Study Plan: Code=F7PBB POV 20 Na	me=Biomedi	cal Tech	nology co	ompulso	ry course
F7PBBALP Alg	porithmic and Programming Theory				۲Z.	4
Algorithm, data structures. Id	entifiers, data types. assignment statement, conditional statement, cycles. Arithmetical a	nd logical operati	ons. Digital	representatio	on of numbe	rs, numeration
systems. Introduction to stru	ctured programming in C language - building and structure of simple programs, creatin	g of the user fund	ctions, user	input and ou	tput, file ma	nagement,
memory management. Pract	ical overview of programming techniques and basic algorithms in C language. Recursiv	e and iterative me	ethods, mea	asuring algori	thm quality.	Abstract data-
types, data sorting and sear	ching, implementation of basic numerical algorithms. Introduction to biomedical data pr	ocessing - progra	mmers vie	w. Introductio	n to softwar	e engineering.
F7PBBAF1 An	atomy and Physiology I.			Z	.ZK	4
Entry requirements of the co	purse: Output knowledge, skills, abilities and competences: The course serves to unc	lerstand the relat	ionships be	tween the sti	ructure and	functions of
the human body. The teaching	ng follows modern pedagogical trends consisting in a direct connection between the mo	orphology and the	e functions	of organ syst	ems. Semin	ar teaching is
closely linked to the topics o	f lectures and connected with practical exercises. It focuses significantly on problems o	f program and us	es activatio	on methodolo	gies to incre	ease student
motivation. The use of mode	rn multimedia programs (eg ADAM and others) is a matter of course. From a theoretica	al and practical po	pint of view,	the main em	phasis will b	be on the
morphology and function of	vital organs and systems.					
F7PBBAF2 An	atomy and Physiology II.			Z	,ZK	4
F7PBBA3A En	glish Language IIIA (part 1)				، ۲	2
The aim of the course is to in	ncrease students' language competence in academic English and professional vocabul	arv. along with co	ommon con	nmunication s	skills. Studer	nts should be
The aim of the course is to increase students' language competence in academic English and professional vocabulary, along with common communication skills. Students should be						
able to work actively with ac	ademic text, understand and be able to use basic terminology, and be aware of the dim	erent stylistic leve	els of Englis	sh and the as	sociated syr	ntactic and
lexical devices.	ademic text, understand and be able to use basic terminology, and be aware of the dim	erent stylistic leve	els of Englis	sh and the as	sociated syr	ntactic and
lexical devices.	glish Language IIIB (part 2)	erent stylistic leve	els of Englis	sh and the as	sociated syr	ntactic and
able to work actively with ac       lexical devices.       F7PBBA3B       Teaching in the summer sem	glish Language IIIB (part 2) nester is based on a modern, non-frontal, project-based, and interdisciplinary way of tea	aching that is gair	els of Englis	sh and the as	sociated syr	ntactic and 2 vstem is based
able to work actively with ac       lexical devices.       F7PBBA3B       Teaching in the summer sen       on the independent creative	glish Language IIIB (part 2) nester is based on a modern, non-frontal, project-based, and interdisciplinary way of tea work of students who are asked to develop an interesting topic in their field of study, i.e	aching that is gair	als of Englis	sh and the as	sociated syr	2 vstem is based eir colleagues
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F7PBBBBBiomechanics and BiomaterialsZ,ZK4The 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 problemThe 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 thsubject 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 whithis is not taken into account the basic knowledge.F7PBBBOZPSafety Regulations and Standards in Electrical EngineeringZSafety and Health protection during work; the role of the biomedical technician in clinical practice; risk-determining effects; patient environment; medical isolated system; electric shocttypes of distribution systems; protection classes; electrical inspections; regulations and standards; work with lasersF7PBBCHMChemistryZ,ZK4Measuring of electric values, principles, using, and parameters. Analogue measuring converters. Electromechanical measuring devices. Current and potential measuring. Frequencyand shift phase measuring. Electric work and electric power measuring: direct current, single-phase and three-phase current. Electrical resistance and impedance measuring. Magne
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 problem.         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 whit this is not taken into account the basic knowledge.         F7PBBBOZP       Safety Regulations and Standards in Electrical Engineering       Z       1         Safety and Health protection during work; the role of the biomedical technician in clinical practice; risk-determining effects; patient environment; medical isolated system; electric shoce types of distribution systems; protection classes; electrical inspections; regulations and standards; work with lasers       Z,ZK       4         F7PBBEM       Chemistry       Z,ZK       4         F7PBBEM       Electrical Measurements       Z,ZK       4         Measuring of electric values, principles, using, and parameters. Analogue measuring converters. Electromechanical measuring devices. Current and potential measuring. Frequency and shift phase measuring. Electric work and electric power measuring: direct current, single-phase and three-phase current. Electrical resistance and impedance measuring. Magne
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FTPBBBOZP       Safety Regulations and Standards in Electrical Engineering       Z       1         Safety and Health protection during work; the role of the biomedical technician in clinical practice; risk-determining effects; patient environment; medical isolated system; electric short types of distribution systems; protection classes; electrical inspections; regulations and standards; work with lasers       Z       1         F7PBBCHM       Chemistry       Z,ZK       4         F7PBBEM       Electrical Measurements       Z,ZK       4         Measuring of electric values, principles, using, and parameters. Analogue measuring converters. Electromechanical measuring devices. Current and potential measuring. Frequency and shift phase measuring. Electric work and electric power measuring: direct current, single-phase and three-phase current. Electrical resistance and impedance measuring. Magne
F7PBBBOZP       Safety Regulations and Standards in Electrical Engineering       Z       1         Safety and Health protection during work; the role of the biomedical technician in clinical practice; risk-determining effects; patient environment; medical isolated system; electric show types of distribution systems; protection classes; electrical inspections; regulations and standards; work with lasers       Z       1         F7PBBCHM       Chemistry       Z,ZK       4         F7PBBEM       Electrical Measurements       Z,ZK       4         Measuring of electric values, principles, using, and parameters. Analogue measuring converters. Electromechanical measuring devices. Current and potential measuring. Frequency and shift phase measuring. Electric work and electric power measuring: direct current, single-phase and three-phase current. Electrical resistance and impedance measuring. Magne
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F7PBBCHM       Chemistry       Z,ZK       4         F7PBBEM       Electrical Measurements       Z,ZK       4         Measuring of electric values, principles, using, and parameters. Analogue measuring converters. Electromechanical measuring devices. Current and potential measuring. Frequency and shift phase measuring. Electric work and electric power measuring: direct current, single-phase and three-phase current. Electrical resistance and impedance measuring. Magnements         Measuring Apalements       Electrical instruction direction
F7FBC-INI         Chernistry         Z,ZK         4           F7PBBEM         Electrical Measurements         Z,ZK         4           Measuring of electric values, principles, using, and parameters. Analogue measuring converters. Electromechanical measuring devices. Current and potential measuring. Frequency and shift phase measuring. Electric work and electric power measuring: direct current, single-phase and three-phase current. Electrical resistance and impedance measuring. Magne
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sub-objective is to enable students to the energy of electrical preferrence at the cell, organism revel, to the possibilities of mediating and using media mediations. A
(anatomy) and function (physiology) of the following systems (excitable tissues): nervous, musculoskeletal, circulatory (especially the heart). The course deals with the problems of
excitable tissues (nervous, The course deals with the physiology of nervous tissue, muscle and glandular tissue and provides knowledge of the physiology of electrical processes at
different levels: cell, tissue, organ, organism.
F7PBBEO Electronic Circuits Z.ZK 4
The course provides a basic orientation in the principles of electronic circuits used in electronic laboratory and medical devices. It provides a prerequisite for the skilled operation of
analogue and digital instrumentation. technology. Course entry requirements: Successful completion of Theoretical Electrical Engineering. Exit Knowledge, Skills, Abilities and
Competencies: Students will become familiar with functional electronic blocks that are used in the design of laboratory and medical instruments. The course will prepare them to
competently assess the basic properties and parameters of electronic devices.
F7PBBEBI   Ethics in Biomedical Engineering   ZK   2
Prerequisites: Knowledge of school humanities objects (philosophy, history, psychology) Target knowledge and skills: basic concepts and controversial topics in biomedical theoretic
and applied ethics; be able to think critically in ethical contexts; argue and defend opinions in ethical dilemma situations; ability development of professional literature and development
of empathy.
F7PBBESP         Management of Health Care Technology         Z,ZK         2
F7PBBFY1 Physics I. Z,ZK 4
Course Physics 1 is used to repeat and expand the basic knowledge of physics in the field of classical mechanics, thermals and optics, which is needed for further study at FBME CT
Students will gain theoretical knowledge, the ability to solve numerical problems and practical skills associated with working in laboratories.
F7PBBFY2 Physics II. Z,ZK 6
The course Physics 2 follows the course Physics 1 and expands the acquired knowledge in the field of electromagnetism and the basics of atomic and nuclear physics and condense
matter physics.
F7PBBFCH   Physical Chemistry   Z,ZK   4
F7PBBFCH       Physical Chemistry       Z,ZK       4         The course is aimed at clarifying the physicochemical principles of topics related to the profession of biomedical engineer and technician in clinical practice or research. The goal of
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F7PBBFCH       Physical Chemistry       Z,ZK       4         The course is aimed at clarifying the physicochemical principles of topics related to the profession of biomedical engineer and technician in clinical practice or research. The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice. The course demonstrates the direct application of theoretical principles in practice.         F7PBBHE       Hygiene and Epidemiology       ZK       1         F7PBBISZ       Information Systems in Health Care       Z,ZK       4         Lectures are focused on the definition of clarification of individual subfields of medical information, the dinition to fusical, complementary, hospit       regional and managerial medical and medical IS are analyzed. The course also provides detailed information on the methodology of development, implementation and support of large-scale information systems in health care.         F7PBBITP       Integral Calculus       Z,ZK       4         The subject is an introduction to integral calculus and integral transforms. Integral calculus: primitive function, indefinite integral, properties and methods of integration (integration by parts and by substitution, partial fractions), definite integral, properties, Newton-Leibnitz fundamental theorem, simple applications of both indefinite integrals, improper integrals, olving differential equations (ODEs) (1st order ODEs with constant coefficients.         F7PBBITP       Integrat calculus and integral transforms. Integral calculus: primitive function, indefinite integral, pr
F7PBBFCH       Physical Chemistry       4         The course is aimed at clarifying the physicochemical principles of topics related to the profession of biomedical engineer and technician in clinical practice or research. The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice. The course demonstrates the direct application of theoretical principles in practice.       7         F7PBBHE       Hygiene and Epidemiology       ZK       1         F7PBBISZ       Information Systems in Health Care       Z,ZK       4         Lectures are focused on the definition and clarification of individual subfields of medical informatics, the links of information systems to the organization of health care, payments an controlling, the definition of IS users and their roles. The course also provides detailed information technology and technical and SW resources for building IS. Attention is also paid to the principles of coding and interpretation of medical data, data standards and communications. The individual types and properties of clinical, complementary, hospit large-scale information systems in health care.       Z,ZK       4         F7PBBITP       Integral Calculus       The subject is an introduction to integral calculus and integral transforms. Integral calculus: primitive function, indefinite integral, properties and methods of integration of integration by parts and by substitution, partial fractions), definite integral, properties, Newton-Leibnitz fundamental theorem, simple applications of both indefinite integrals, improper integral, solving differential equations for solving nth order linear OD
F7PBBFCH       Physical Chemistry       Z,ZK       4         The course is aimed at clarifying the physicochemical principles of topics related to the profession of biomedical engineer and technician in clinical research. The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice. The course demonstrates the direct application of theoretical principles in practice.       TK       1         F7PBBHE       Hygiene and Epidemiology       ZK       4         Lectures are focused on the definition and clarification of individual subfields of medical informatics, the links of information systems to the organization of health care, payments an controlling, the definition of IS users and their roles. The course also provides detailed information on the methodology of development, implementation and support of medical data, data standards and communications. The individual types and properties of clinical, complementary, hospit regional and managerial medical and medical and medical at medical and medical data, data standards and communications. The individual types and properties of clinical, complementary, hospit arge-scale information systems in health care.       Z,ZK       4         F7PBBITP       Integral Calculus       The tubject is an introduction to integral calculus and integral transforms. Integral calculus: primitive function, indefinite integral, properties and methods of integration (integration fintegrals, particulary double integral and applications. Integral transforms: Laplace transform and their application of solving nth order linear homogenous ODEs with constant coefficients.       Z,ZK       4
F7PBBFCH       Physical Chemistry       Z,ZK       4         The course is aimed at clarifying the physicochemical principles of topics related to the profession of biomedical engineer and technician in clinical practice or research. The goal of the course is to privide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic.         F7PBBHE       Hygiene and Epidemiology       Z/K       1         F7PBBISZ       Information Systems in Health Care       Z,2K       4         Lectures are focused on the definition and clarification of medical data standards and communications. The individual types and properties of clinical, complementary, hospit regional and managerial medical and medical IS are analyzed. The course also provides detailed information technology of development, implementation and support of the systems in health care.         F7PBBITP       Integral Calculus       Z,ZK       4         The subject is an introduction to integral calculus and integral transforms. Integral calculus: primitive function, indefinite integral, properties and methods of integration (integration bia parts and by substitution, partial fractions), definite integral, properties, near homogenous ODEs with constant coefficients), into to multiple integrals, properties, clinical research momentary.       Z,ZK       4         Vignama an praktické p Ikday naszeni information to rollowed to multiple integral, properties of othind difficient integrals, introperties, clinical complementary.       Z,ZK       4         The subject is an introduction to integ
F7PBBFCH       Physical Chemistry       Z,ZK       4         The course is simed at clarifying the physicochemical principles of topics related to the profession of biomedical engineer and technician in clinical practice or research. The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice. The course demonstrates the direct application of theoretical principles in practice.       ZK       1         F7PBBHE       Hygiene and Epidemiology       ZK       4         Lectures are focused on the definition and clarification of individual subfields of medical informatics, the links of information systems to the organization of health care, payments an controlling, the definition of IS users and their roles. The course also provides detailed information systems to the organization of health care, payments an controlling, the definition of IS users and their roles. The course also provides detailed information on the methodology of development, implementaton and support of large-scale information systems in health care.       Z,ZK       4         F7PBBITP       Integral Calculus       Z,ZK       4         The subject is an introduction to integral calculus and integral transforms. Integral calculus: primitive function, indefinite integral, properties and methods of integration (integration integrals, properties, and methods of integration (integration to integration (integration and on-homogenous ODEs) with constant coefficients), into to multiple integrals, particularly double integral and applications of both indefinite integrals, improper integral, solving differential equations (ODEs) (1st order
F7PBBFCH       Physical Chemistry       4         The course is simed at clarifying the physicachemical principles of topics related to the profession of biomedical engineer and technical in incluital reactice or research. The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice. The course demonstrates the direct application of theoretical principles in practice.         F7PBBHE       Hygiene and Epidemiology       ZK       1         F7PBBISZ       Information Systems in Health Care       Z,ZK       4         Lectures are focused on the definition and clarification of individual subfields of medical informatios, the links of information systems to the organization of health care, payments an controlling, the definition of IS users and their roles. The course includes the necessary overview of information systems to the organization of health care, payments an controlling, the definition of IS users and their roles. The course also provides detailed information on the methodology of development, implementation and support of large-scale information systems in health care.         F7PBBITP       Integral Calculus       Z,ZK       4         The subject is an introduction to integral calculus and integral transforms. Integral calculus; primitive function, indefinite integral, properties and methods of integration (integration b parts and by substitution, partial fractions), definite integrals, particularly double integral and applications of DoES, and order linear Anomagenia and non-homogenous SDEs, and order linear Anomagenia (Headet alse) (Istorder DDEs with separablea variables, line
F7PBBFCH       Physical Chemistry       4         The course is simed at clarifying the physicochemical principles of topics related to the profession of biomedical engineer and technician in clinical research. The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice. The course demonstrates the direct application of theoretical principles in practice.       Information Systems in Health Care         F7PBBHZ       Information Systems in Health Care       Z,K       4         Lectures are focused on the definition and clarification of individual subfields of medical informatios, the links of information systems to the organization of health care, payments an controlling, the definition of IS users and their roles. The course includes the necessary overview of information technology and technical and SW resources for building IS. Attention is also paid to the principles of coding and interpretation of medical data, data standards and communications. The individual types and properties of clinical, complementary, hospit regional and managerial medical factors. Integral calculus printitive function, indefinite integral, properties of clinical, complementary, hospit regional and managerial racical calculus and integral transforms. Integral calculus: printitive function, indefinite integral, properties and methods of integration of theoretical integration, integratian controlling and control integratian. Increased and finite integratary, increased and paylication for solving thin offer linear tops with constant coefficients). Intro or utiliple integrals, particularly double integral and paplications. Integral transforms: Laplace transforms and hearesed and promogenous as well as non-homogenous ODEs. with consta
F7PBBFCH       Physical Chemistry       Z,ZK       4         The course is is med at clarifying the physicachemical principles of topics related to the profession of biomedical engineer and technician in clinical practice or research. The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice.         F7PBBHE       Hygine and Epidemiology       ZK       1         F7PBBISZ       Information Systems in Health Care       Z,ZK       4         Lactures are focused on the definition and clarification of individual subfields of medical information, technology and technical and SW resources for building IS. Attention is also paid to the principles of coding and interpretation of medical data, data standards and communications. The individual types and properties of clinical, complementary, hospit regional and managerial medical and medical Tare analyzed. The course also provides detailed information on the methodology of development, implementation and support of large-scale information integral calculus: primitive function, indefinite integral, properties and medical finite graits, improper integrai, solving differential equations (ODEs) (1st order ODEs with separable variables, linear 1st order honogenous as well as non-homogenous ODEs, with constant coefficients), into to multiple integrais, particularly double integral and pplications integrat ransforms: Laplace transform and inverse Laplace transform and inverse paratick of association, while principles or long and technology of development, implementation and inverse Laplace transform and their application for solving nth order linear ODEs with constant coefficients), into to multiple integrais, particular
F7PBBFCH         Physical Chemistry         Z,ZK         4           The course is simed at clarifying the physicachemical principles of topics related to the profession of biomedical engineer and technician in clinical practice or research. The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice.           F7PBBIE         Hygiene and Epidemiology         ZK         1           F7PBBISZ         Information Systems in Health Care         Z,ZK         4           Lectures are focused on the definition and clarification of individual subfields of medical information, systems to the organization of health care, payments an controlling, the definition of Is users and their roles. The course includes the necessary overview of information systems in the auth care.         Z,ZK         4           Large-scale information systems in health care.         Z,ZK         4         4           Large-scale information systems in health care.         Z,ZK         4           F7PBBITP         Integral Calculus         The subject is an introduction to integral calculus and integral transforms. Integral calculus: primitive function, indefinite integral, properties and methods of integration integration by and non-homogenous ODEs.         Z,ZK         4           The subject is an introduction to integral calculus and integral transforms. Integratical transforms: Large are transform and their application or biothindefinite integrals, improper integral, solving differential equati
F7PBBFCH       [Physical Chemistry       Z,ZK       4         The course is atimated at clarifying the physicochemical principles of topics related to the profession of biomedical engineer and technician in clinical research, or directly in clinic practice.       TXK       1         F7PBBISZ       Information Systems in Health Care       Z,K       1         F7PBBISZ       Information Systems in Health Care       Z,K       4         Lectures are focused on the definition risk cares and their rolicules the necessary overview of information systems to the organization of health care, payments an controlling, the definition risk uses and their rolicules. The course also provides detailed information. The individual types and properties of clinical, complementary, hospiti is also paid to the principles of coding and interpretation of medical data, data standards and communications. The individual types and properties of elinical, complementary, hospiti is also paid to the principles of coding and interpretation of medical data, data standards and communications. The individual types and properties of elinical, complementary, hospiti and by substitution, partial fractions), definite integral, properties and methods of integration (integration b) parts and by substitution, partial fractions), definite integral, properties and methods of integration (integration b) earlies in their application of solving nth order linear ODEs with constant coefficients).         F7PBBIT       Communication Technology       Z,ZK       4         Parts and by substitution, partial fractions), definite integral, properties, heavioux (integration and paplications integration (integratian) and paplication of solving nth order linear O
F7PBBFCH       [Physical Chemistry       Z,ZK       4         The course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice.         F7PBBHE       Hygiene and Epidemiology       ZK       1         F7PBBISZ       Information Systems in Health Care       Z,ZK       4         Lectures are focused on the definition of lowidual sublields of medical information, systems to the organization of health care, payments an controlling, the definition of IS users and their roles. The course is also provides detailed information managerial medical and medical S are analyzed. The course also provides detailed information on the methodology of development, implementation, and support of large-scale information systems in health care.       Z,ZK       4         F7PBBITP       Integral Calculus       Z,ZK       4       4         F7PBBITP       Integral Calculus       Z,ZK       4         F1PBsUT       Integral Calculus       Z,ZK       4         F7PBBITP       Integral Calculus and integral transforms. Integral calculus: primitive function, indefinite integral, properties and methods of integration of integration of the solitic anstructure, solitical and solitical solitication of solitican of the solitication of solitican of the solitication of solitindefinite integral, propertites and methods of
F7PBBFCH       Physical Chemistry       4         The course is aimed at clarifying the physicachemical principles of topics related to the profession of biomedical engineer and technician in clinical research. The goal of the course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice. The course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice. The course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice.         F7PBBHE       Hygiene and Epidemiology       ZK       1         F7PBBHE       Hygiene and clarification of individual subfields of medical information, systems to the organization of health care, payments an controlling, the definition of IS users and their roles. The course iso provides detailed information role methodology of development, implementation and support of large-scale information systems in health care.       Z,ZK       4         F7PBBHT       Integral Calculus       Z,ZK       4       4         F0 substitution, partial fractions), definite integral properties, Network-Lishniz fundamental theorem, simple applications on both indefinite and definite integrals, improper integral, subviolid differential equations (ODES) (14 order ODEs with constant coefficients), into to multiple integrals, particularly double integral and applications. Integral transforms: Laplace transform and inverse Laplace transform and inverse Laplace transform
F7PBBFCH       Physical Chemistry       4       4         The course is to provide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical research, or directly in clinic practice.       F7PBBHE       Hygiene and Epidemiology       ZK       1         F7PBBHE       Hygiene and Epidemiology       ZK       1       1       Z/XK       4         F7PBBHE       Hygiene and Epidemiology       Z/X       4       1       1       2       Z/X       4         F7PBBHE       Hygiene and Epidemiology       Z/X       4       1       1       2       Z/X       4         F7PBBHE       Hygiene and Epidemiology       Z/X       4       1       2       Z/X       4         F7PBBTP       Integration of hadivatus subfields of medical data, data standards and communications. The individual types and properties of colinical, complementary, hospiti       is also paid to the principles of coding and interpretation of medical data, data standards and communications. The individual types and properties of and medical Experimentary. Insegiti differential equations (ODE) (15 order ODEs with separable write/astand fibration, parial fractions), definite integral, properties, Newton-Lebnitz fundamental theorem, single applications of both indefinite and definite integrals, improper integral, solving differential equations (ODE) (15 order ODEs with constant coefficients).       Z/ZK       4         The subject is an i

F7PBBMAZ	Management and Admininistration in Health Care	KZ	1
F7PBBMEC	Mechanics	Z,ZK	4
Students will get acquai	nted with the following areas of mechanics: General physical equations, Newton's laws, statics and dynamics. Force and mo	ment effect - deco	mposition,
replacement. Equilibriun	n of a force system in a plane and space - equation of equilibrium, systems into equilibrium. Reactions on statically determin	ed systems - moti	on restrictions,
spatial and planar const	raints, solution of reactions. Static moment, center of gravity and center of area. Spatial moment of inertia - kinetic energy of re	otational motion, p	product moment,
momentum, law of cons	ervation of momentum. Second moment of area - product moment, polar moment, Mohr circle, main moments of inertia, ellip	se of inertia. Inter	nal static effects
- beam, system of plates	s, course of internal static effects, kinematic method, statically indeterminate problems. Mechanical properties of materials -	tests of mechanic	al properties,
stresses and deformation	ns, Hooke's law. Stress and strain - uniaxial and biaxial stress state, simple bending, bending curve, torsional stress, cross-s	section design, thi	n-walled
cross-sections, combine	d stress, nonlinear models. Buckling strength - critical load, stability of members, calculation of cross section. Tests of hardness,	adhesion, toughn	ess, tribological.
F7PBBMT	Medical Terminology	7	1
Attendants are made ac	iniciated 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 therapeut	quantice with particular terms nowing non-inductive source source and any new new sources of tests		
	Descentes Methodales	1/7	2
	Research Methodology	rz	
I ne course introduces s	tudents to the basic methods of research work and the requirements for scientific communication. The course also introduce	es students to the	principles of
writing and presenting o	t bachelor's thesis.		
F7PBBMS	Modelling and Simulation	Z,ZK	4
Basic concepts and cons	equences of modeling and simulation. Be able to use modeling and simulation methodologies. Emphasis is placed on a thoroug	h understanding o	f compartmental
models, physiological m	odels, pharmacokinetics. Furthermore, continuous and discrete models of population dynamics, epidemiological models, mo	dels of venereal o	liseases.
F7PBBNMP	Project Proposal and Management	KZ	2
As part of the lectures,	tudents will become familiar with topics such as project management (PM) according to IPMA, the certification process, pro	ject, program, por	tfolio, phases,
and the project life cycle	, as well as project initiation. They will learn about the feasibility study, project initiation, project identification document, and	logical framework	. Other topics
include an introduction t	o project planning, scheduling, risk and risk analysis, project implementation, behavioral competencies in PM, project closur	e, and evaluation.	Students will
also gain practical insigh	ts from a hospital environment. During the exercises, students will master the following concepts and topics and develop rele	vant outputs: tean	nwork. feasibilitv
study, identification docu	ment, logical framework. WBS (Work Breakdown Structure a hierarchical structure of tasks or activities), scheduling, risk ana	alvsis, project impl	ementation. and
a final test. As part of th	s course students have the opportunity to obtain the IPMA I evel D certification, which is intended for aspiring project mana	gers project coor	dinators and
team members. The cer	o control, or and the opening to obtain the name born of opening the obtain the name born of the opening project mana	golo, project cool	
	Deste state of the second se	71/	
F/PBBUIZ	Protection Against Ionizing Radiation	ZK	2
F7PBBPPS	Pacient and Device Simulators and Testers	Z,ZK	2
Patient and instrument s	imulators and testers. Basic principles of implementation, connections with other disciplines. Detailed description and impler	mentation of a sel	ected model of
a subsystem. Design an	d implementation of patient and instrument simulator sub-blocks. Examples of circuit implementations of simulators and teste	rs. Environment, s	cenario creation
and other related procee	dures in manikin control, basic concepts and principles of anesthesiology. Other types of simulators and phantoms. Possibilit	ies of use in clinic	al practice.
Practical demonstration	Connection of the simulator with other medical equipment. Simulators and testers. Implementation of an established simula	tion scenario, sce	nario testing,
creation of new scenario	os. Collaboration between HPS and anaesthesia machine.		
F7PBBPPM1	Programming in Matlab I	K7	1
Students will learn how	o use Matlab. det knowledge of data structures and with data and working with data and their display. During the semester, the	ev will gain knowl	edge of creating
scripts in Matlah and the	a basics for their use in the procession of hiomedical data	ie) ini gan aien	eage of creating
	Programming in Methods II	K7	2
	Programming in Mauad II.		<u>ک</u>
The aim of the course is	to understand the topic of scripting languages and their applications, to understand their advantages and disadvantages and		arity with system
languages. Students wil	become raminar with regular expressions and tools for word processing. The course focuses on the scripting languages with	hin the Unix opera	iting system and
the scripting languages		I	
F7PBBPNK	Design and Construction of Medical Devices/Practical Exercises	KZ	4
The aim of the practical	y oriented course is to acquaint students with the design process of the measuring part of the device, ie basic problem analy	sis, determination	n of functional
blocks and their design,	selection of suitable components and their values with emphasis on working with catalog sheets and application recommen-	dations, preparation	on of electrical
documentation and boa	d design. printed circuit board, its mounting, soldering and revitalization. During the course, students will implement a function	onal device (mour	ting, soldering,
recovery) electronic the	mometer, which will consist of two functional units - analog part for temperature measurement and signal conditioning (equi	pped with THT co	mponents) and
display element with dio	de bargraph (equipped with SMT components ). For both products, students will implement the design of the diagram and PCE	3 in the CAD envir	onment EAGLE.
In addition to the analog	part of the device, an application for digitizing data from the analog device using NI-DAQ cards and a cheap solution with the he	elp of Arduino will I	be implemented.
The last part will be a se	ervice intervention in the device (monitor of vital functions) with emphasis on safe handling and measurement of test points.		
F7PBBPMS	Probability and Mathematical Statistics	7 7K	4
Objectives: to familiarize	students with the basic principles of the theory of probability and mathematical statistics. Pre-requisites and entry requirem	ents of the course	Knowledge of
mathematics (linear alg	bra differential and integral calculus) in the range of E72PBI AD and E72PBBITP courses taught in the first year of study. Kn	owledge skills at	nilities and
competencies: The stude	the accurate and with the probabilistic model has conditions of Kolmonorov theory of probability and inductive statistics. The	student can apply	these definitions
to practical problems the	and subquarter with the probability mode, basic definitions of the model when you have a subject to the student is familiar with the ha	sic methods of in	ductive statistics
and can choose a suitat	a method for standard statistical problems		
	First A	1/7	
F/PBBPP	FIRST AId	κz	2
F7PBBPSL	Psychology	KZ	2
Development, methodol	ogy and methods of psychology. Mental activities and psychic processes, psychology of personality, objects of psychology and	their formation a	nd development.
Modern psychology; its	concept and theory, psychic processes and stages. Psychological interpretation of personality. Application of knowledge in me	edical situations. R	elation between
technicians and medical	doctors, technicians and patients, technicians and nurses. Communication as a tool for good cooperation amongst people a	and an aid to inter	actions. Basic
expression and commur	nication skills. Use of elocution and gestures in personal expression. Verbal and nonverbal communication. Dialogue; types o	f dialogue, questio	ons during
dialogue. Model situation	ns. Communication process as part of economics - components, tools and functions.		
F7PBBROP	Guided Practical Training	7	2
Familiarization of studer	ts with the organization and provision of professional internships at the clinical workplace. Provision of contractual document	ts for the implement	entation of the
ROP (supervised profes	sional practice) The ROP will then enable the acquired practical skills and habits to be applied in the key subjects of the 3rd	vear The student	thus has an
overview of the ourrest	echnical level of hospital equipment; an overview of the organization of the work of hismodical technicians and engineers; or	an apply legal reg	uiremente to
ensure the safe opportion	in of medical equipment. He can communicate with technicians, but also medical staff. He is able to work in a team	an apply legal leq	
		1/7	4
F/PBBSPR1	Semestral Project I.	KZ	1
The topic of the semester	er project (SPR1) must be in the field of biomedical engineering and must be related to the study field of the same name Bior	nedical Techniciai	n. 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, topic	s based mainly o	n the creation of
research, clean program	ming, 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 to	pic 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.

F7PBBSPR2	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 topic as basic	communication a	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	a commented bibliographic search. The student solves topic (project) from the selection of the PROJECTS database - http://p	rojects.fbmi.cvut.	cz During the				
term, there are dedicate	a 2 hours every week for work under teacher supervising.		4				
	Bachelor Thesis Seminar		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	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 committe	e. Course entrand	ce requirements:				
Prerequisite F7PBBMVF	<sup>2</sup> Exit Knowledge, Skills, Abilities and Competencies: Students are tully aware of the requirements for the requirements of profess	ional reports and o	communications,				
they are proficient in the	e orientation in the professional literature. The students are able to understand the literature and literature on a given topic, ap	ply scientific rese	earch methods				
to specific assignments	They present their proposed solutions and results, are able to interpret the results.	7 71/	4				
F7PBBSM	Sensors in Medicine	Z,ZK	4				
This subject provides in	tormation about basic electronic devices - sensors, describes their operation principle, basic circuit configuration and applica	tion. The stress is	aid mainly on				
ciaritying of basic princi	ples and practical utilization. Integral part of this course is basic information about sensors of non-electric quantities and their	read-out circuits e	eg. strain related				
sensors (force, pressure	, torque, vibration, displacement, acceleration etc.) magnetic field sensors, temperature sensors, cnemical sensors, optical se	ensors and bioser	isors. The stress				
is aid on miniaturization	, integration		_				
F7PBBSEL	Power Engineering	Z,ZK	5				
Basics of power electro	nics, power supplies, including electrochemical sources, rectifiers, stabilizers, the most commonly used types of motors, basi	cs of power distrib	oution, types of				
electrical systems and o	connecting appliances with a focus on medical use. Emphasis is placed primarily on the physical nature of the problem and it	s understanding.	knowledge will				
be verified on practical	examples and in the laboratory.						
F7PBBSPT	Research Methodology	Z,ZK	4				
The main objective of the	e course is to introduce students to the basic equipment of intensive care units (ICU) and anesthesiology and resuscitation of	lepartments of ho	spitals. These				
are devices to support v	ital functions, especially lung ventilation, as well as patient monitors, anesthesia machines and their parts and other equipme	nt. Another object	ive of the course				
is to integrate knowledg	e and skills of students from the fields of science (especially physics, chemistry and physiology) and engineering (modeling, c	ircuit theory, pneu	imatic elements,				
etc.) in the analysis of c	linical technology and in the design and implementation of functional technical systems.						
F7PBBTEL	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 electric	ectrical energy. C	onnection of the				
electrical systems. Inpu	t resistance and impedance, idle voltage, inner resistance and impedance of the source, mutual loading of the source and ele	ectrical appliance,	impedance				
matching. Properties of	circuits in time and frequency domain. Transient action in DC circuits, frequency characteristics of the L/C circuit. Electrical c	urrent in semicon	ductor, type of				
the conductivity, creation	n of the semiconductor crossing, properties in the forward and reverse direction. Bipolar transistor - transistor effect, basic princ	iple in elementary	circuit. Unipolar				
transistor. Unipolar trans	sistors with complementary vodivosti (CMOS). Electromagnetic effects (induction, magnetization, force effect). Electromagnet	ic wave, spreadin	ig, interference,				
electromagnetic compa	ibility. Soft and hard magnetic materials. Transformers construction and parameters. Magnetic recording and reproduction of	signals. Electrom	otors principles.				
F7PBBTZS	Tomographical Imaging Systems	Z,ZK	4				
CT systems (basic prine	siple, schematic arrangement system, basic physical principle, developmental generations, basic principles of reconstruction)	. Imaging system	s magnetic				
resonance. PET and SF	PECT principle. Specialized imaging systems (hybride). Ultrasound imaging systems. Doppler systems. Subject and especially	y laboratory exerc	ises provide				
students with an insight	into the principles of creating image data used in medicine, the principle of methods their scanning, digitization and subsequ	ent processing, or	n 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 a	s a whole.					
F7PBBUSS	Introduction to Signals and Systems	Z,ZK	4				
The aim of the course is	to acquaint students with the basics of signal processing, especially with time and frequency domain operations. Emphasis is pl	aced on a thoroug	h understanding				
of Fourier analysis. The	second part of the course is focused on acquainting students with systems, their properties and description. Emphasis is pla	ced on the extern	al and internal				
description of linear dyr	amical systems.						
F7PBBZP	Basics of Pathology	ZK	2				
F7PBBZLN	Legislation in Health Care and Technical Standards	KZ	2				
Aims / aims: The aim of	the course Legislation in Health Care and Technical Standards is to teach students the basic requirements and regulatory of	ligations in health	ncare, especially				
in the field of medical de	vices. During the course, students will learn the basics of legislation process, as well as regulation related to the medical devic	ces, Iso with legisl	ative regulations				
in the field of clinical tria	als and the operation of medical devices. Furthermore, students will learn the legal context of providing health care. The aim i	s to acquaint stud	lents with the				
rights and obligations a	ising from current legislation relating to health care issues. The emphasis is not on memorizing of the text of legal regulations	, but on acquainti	ng students with				
the main points and ide	as contained in the laws, regulations and standards of the Czech Republic and EU directives in the field of healthcare. Prerec	uisites and co-re	quisites: To				
successfully complete t	he course, students should know the basics of the principles of medical devices due to the practical application of legislation	in this area. Outp	ut knowledge,				
skills, abilities and comp	betences: After completing the course, the student should have a comprehensive overview of health legislation. He should be	able to orientate h	imself in a given				
problem related to legis	lation without any problems and he should know where he can find individual details related to legal issues in health care.		-				

### Name of the block: Compulsory elective courses Minimal number of credits of the block: 10

The role of the block: S

#### Code of the group: F7PBB 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
F7PBBEZP	Economics of Health Services	KZ	2	1P+1C	L	S
F7PBBMAT	Marketing of Medical Technology Tomáš Kolá <b>Tomáš Kolá</b> Tomáš Kolá (Gar.)	KZ	2	2P	L	S

	Programming Tools		-			
FTPBBPPP	Pavel Smr ka, Tomáš Funda, Radim Kliment <b>Pavel Smr ka</b> Pavel Smr ka (Gar.)	ΚZ	2	20	L	S

## Characteristics of the courses of this group of Study Plan: Code=F7PBB PV 2S 20 Name=Biomedical Technology compulsory optional course

000100					
F7PBBEZP	Economics of Health Services	KZ	2		
Methodology of managing the economics of healthcare operations. The role of management and administration. Healthcare legislation and law, application of laws in a real hospital.					
The role of management control and its role in the medical technology market, Planning strategies, analysis and research of consumer and organisational markets, market development					
and positioning. Aim: ec	onomics of healthcare operations, which is the goal and guarantee of success and level of healthcare delivery. The course The	ne course provide	s a knowledge		
base for the PBB2ESP of	course. Course entry requirements: Exit knowledge, skills, abilities and competencies: the student will be able to calculate inte	rest, inflation, ann	uity. The student		
will therefore be able to	be able to produce the economic part of a feasibility study.				
F7PBBMAT	Marketing of Medical Technology	KZ	2		
F7PBBPPP	Programming Tools	KZ	2		
The aim of the course is	to provide an overview of basic application software for GNU / Linux and MS Windows with examples and examples of use, incl	uding a comparise	on of parameters		
of individual programs.	The areas of focus of individual program resources are selected with regard to the usability of FBMI students in other subject	s and also in the	preparation of		
qualification works and	in subsequent professional employment in the field. The entry requirements of the course are knowledge of computer control	I at the secondary	/ school level.		
After completing the cou	urse, students will gain the following output knowledge, skills, abilities and competencies: Routine control of common user pro	ograms in MS Wir	ndows and GNU		
/ Linux, measured in the	following areas: creation of technical documentation, processing of 2D graphics, audio, video, secure information sharing and	I network commur	nication, creation		
and publication of perso	nal web pages, processing and visualization of biomedical data, basics of scripting.				

#### Code of the group: F7PBB 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
F7PBBBFT	Biophotonics Jan Remsa, Jan Mikšovský, Petr Písa ík <b>Petr Písa ík</b> Petr Písa ík (Gar.)	KZ	2	2P	Z	S
F7PBBFVP	Multivariable Calculus Jana Urzová Jana Urzová Jana Urzová (Gar.)	KZ	2	1P+1C	Z	S
F7PBBMFJ	Physical Phenomena Modeling in COMSOL MULTIPHYSICS David Vrba David Vrba David Vrba (Gar.)	KZ	2	1P+1C	Z	S

# Characteristics of the courses of this group of Study Plan: Code=F7PBB PV 3S 20 Name=Biomedical Technology compulsory optional course

F7PBBBFT	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, pl	notobiology, bioimaging, basics of lasers, laser safety, optical biosensors, photodynamical therapy, optical manipulation with cells	s, nanotechnology	for biophotonics,					
biomaterials for photoni	biomaterials for photonics.							
F7PBBFVP	Multivariable Calculus	KZ	2					
The course is focused a	t elements of calculus in two and more variables and at real, complex and functional series. Calculus in two variables: notion	of a limit and cor	ntinuity, partial					
derivative, differential a	nd its applications. Derivative of a composed function, derivative of an implicit function. Higher order derivatives, local extrem	es. Constrained e	xtremes, least					
squares method. Double	e and triple integrals, geometrical interpretation, Fubini theorem. Integration by substitution in double and triple integral. Comp	lex sequences, se	ries of numbers.					
Convergence of comple	x series. Functional series and their convergence, power series. Taylor series							
F7PBBMFJ	Physical Phenomena Modeling in COMSOL MULTIPHYSICS	KZ	2					
Numerical simulations a	are increasingly being used to develop new and optimize existing products and devices. Numerical simulations can greatly re-	duce the number	of prototypes					
needed and thus signifi	cantly accelerate and reduce development costs. Another sector where numerical simulations are used is a sector where it is	difficult to verify	ongoing physical					
processes (eg, heating	the biological tissue under electrodes for direct brain simulation). Last but not least, based on numerical simulations, we can	plan treatment wi	nere, based on					
knowledge of material p	properties, we can define the amount of power delivered to the device (eg radiofrequency ablation in oncology or cardiac surg	gery). Computer m	odeling involves					
the creation of geometry	y, setting of material properties and boundary conditions and, last but not least, the choice of differential equations, the method	d of discretization	of the computing					
area and the processing of results. The accuracy of the results obtained, the length of calculations and the computational power requirements are very dependent on the numerical								
model setting. The lectures cover the most common problems in electrical engineering, thermics, mechanics, chemistry, acoustics and fluid dynamics. The acquired knowledge will be								
tested by the students when designing individual parts of devices and devices.								

Code of the group: F7PBB PV 4S 24

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:

	Name of the source / Name of the group of sources	1				
Code	(in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
F7PBBDIZ	Detectors of Ionizing Radiation Ladislav Pína Ladislav Pína Ladislav Pína (Gar.)	KZ	2	2P	L	S
F7PBBMDT	Microwave Diagnostics and Therapy Ond ej Fišer, Jan Vrba, David Vrba, Tomáš Pokorný Ond ej Fišer Jan Vrba (Gar.)	KZ	2	1P+1L	L	S
F7PBBPTI	Principles and Practice in Tissue Engineering Roman Mat jka, Jana Mat jková Roman Mat jka Roman Mat jka (Gar.)	KZ	2	0P+2C	L	S
F7PBBSJ	Scripting Languages Tomáš Kraj a Radim Krupi ka Radim Krupi ka (Gar.)	KZ	2	2C	L	S

# Characteristics of the courses of this group of Study Plan: Code=F7PBB PV 4S 24 Name=Biomedical Technology compulsory optional course

F7PBBDIZ	Detectors of Ionizing Radiation	KZ	2			
F7PBBMDT	Microwave Diagnostics and Therapy	KZ	2			
Interaction of the EM fie	d 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	sification 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 tr	eatment. Design			
and testing of applicato	Ind testing of applicators.					
F7PBBPTI	Principles and Practice in Tissue Engineering	KZ	2			

 F7PBBSJ
 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 complementarity to system languages. The course focuses on scripting languages in the Unix operating system and Python scripting languages.

#### Code of the group: F7PBB 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
F7PBBAZD	Biomedical Data Analysis and Processing Jan Kauler, Lucie Horáková Jan Kauler Jan Kauler (Gar.)	KZ	2	1P+1C	Z	S
F7PBBMTB	Microprocessors in Biomedicine Pavel Smr ka, Karel Hána Pavel Smr ka Pavel Smr ka (Gar.)	KZ	2	1P+1L	Z	S
F7PBBTA	<b>Technical Audiology</b> Oliver Profant, Zbyn k Bureš <b>Oliver Profant</b> Oliver Profant (Gar.)	KZ	2	1P+1L	Z	S
F7PBBZOD	Image Data Processing Zoltán Szabó, Pavla Suchánková Zoltán Szabó Zoltán Szabó (Gar.)	KZ	2	1P+1C	Z	S

## Characteristics of the courses of this group of Study Plan: Code=F7PBB PV 5S 20 Name=Biomedical Technology compulsory optional course

 F7PBBAZD
 Biomedical Data Analysis and Processing
 KZ
 2

 F7PBBMTB
 Microprocessors in Biomedicine
 KZ
 2

 We will explain the principle and building elements of a microprocessor system, the structure of a microprocessor, the connection of basic peripherals, the programming model of a microcomputer system in the form of a practically oriented explanation and demonstration tasks. Provide a basic overview of ATMega and ARM Cortex M architectures with practical examples of their programming with examples of use in biomedicine. Prerequisites and co-requisites: basic knowledge of digital technology and signal processing, basics of ISO C. Output knowledge, skills, abilities and competencies: The student is familiar with the selection and design of microprocessor system solutions for use 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 and parallel communication, counters and timers, interrupt controller. Understands the basics of communication of microcomputers with the environment: interfaces for LCD displays, keyboards, RS232, Ethernet, WIFI, Bluetooth, XBee and mobile 3G / 4G communication, GPS / GLONAS localization.

F7PBBTA	Technical Audiology	KZ	2
The aim of the course i	to give students a basic overview of audiology, i.e. basic knowledge of biology, medicine and technology in relation to norma	al and impaired h	earing, and all
this in an interrelated c	ontext with emphasis on technical aspects. Motivation to work in clinical practice in audiology is also an integral part of this go	al. workplace. Co	urse entry
requirements: These re	quirements 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	s), - nervous
system - motor system,	brainstem (structure, reflexes), cerebellum (structure, reflexes), basal ganglia (structure, reflexes), cerebral cortex (structure, r	exlexes), physiolo	ogy of movement
control, - sensory nervo	us system - receptors, skin sensation, movement and position perception, vision, hearing, taste, smell, pain, autonomic nervous	system, brain ster	n, hypothalamus,
peripheral compartmen	ts: 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 s	systems, systems	and their
description, linear and r	on-linear system, - external description of continuous and discrete linear system - differential/differential equations, transfer fu	nctions, frequenc	y characteristics,
distribution of zeros and	I poles, time characteristics, - coupling of systems, feedback loops, - Characteristics of basic biosignals EEG, ECG, EOG, EF	P, EMG, artefacts,	origin, sources,
diagnostic applications	frequency range and bands, - Biological data acquisition and preprocessing, basic computer conversion chain, A/D converte	ers, problems sign	al sampling and
quantization, Nyquist th	eorem, conversion errors, signal conditioning, aliasing, filtering, trends, sensing options. Output knowledge, skills, abilities an	d competences:	Students will
acquire a basic underst	anding of acoustics, measurement and diagnosis of auditory functions, including technical principles. instrumentation and so	ftware, and hearir	ng aids and
replacements. The stuc	ents will be able to orient themselves. They will be able to learn about these issues, learn about other areas of medical instru	mentation and m	ethods used in
clinical practice, as wel	as motivated and ready to enter the field of audiology upon graduation and to add to this knowledge and advanced skills wit	hin 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 comp	etence Technical	audiologist after
graduation, i.e. after ob	aining the so-called professional competence Biomedical technician under the Act.		
F7PBBZOD	Image Data Processing	KZ	2
The aim of the course i	s to provide basic knowledge about the principles of the digital image processing process (algorithms - implementation and re	ealization). This g	oal also includes
the issue of digitization	and basic methods of image data analysis.		

#### Code of the group: F7PBB 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
F7PBBAZC	Algorithms for Biosignals in the C Language Pavel Smr ka Pavel Smr ka Pavel Smr ka (Gar.)	KZ	2	1P+1C	L	S
F7PBBEMP	Electromagnetic Fields of Living Organisms Ond ej Fišer, Jan Vrba Ond ej Fišer Jan Vrba (Gar.)	KZ	2	1P+1L	L	S
F7PBBRBL	Robotics in Medicine Jan Kauler Jan Kauler (Gar.)	KZ	2	1P+1C	L	S

# Characteristics of the courses of this group of Study Plan: Code=F7PBB PV 6S 20 Name=Biomedical Technology compulsory optional course

F7PBBAZC AI	gorithms for Biosignals in the C Language	KZ	2
Explain the principle and im	nplementation of the most used algorithms for biosignal processing and their specific functional (and time and memory eff	ficient) implement	ation in C and C
++ in the form of practically	oriented interpretation and demonstration tasks. Graduates will be acquainted with specific solutions to basic algorithmic	problems in biosi	gnal processing:
with segmentation, analysis	s in the time and frequency domain, with the design of linear digital filters (FIR and IIR) and with the visualization of result	s. Prerequisites a	nd co-requisites:
basic knowledge of systems	s and signal processing, basics of ISO C. Output knowledge, skills, abilities and competences: The student is familiar with	algorithms for pro	eprocessing and
intelligent segmentation of b	piological time series in C and C ++, eg: FFT algorithm, SFFT and wavelet transforms, algorithm for calculating autocorrelation	on and cross-corre	elation functions,
convolution, etc. Can implei	ment in C language the floating time window method for feature extraction and basic algorithms for the design and impler	nentation of digita	I FIR and IIR
filters. Understands and car	n implement in C language the basic ways of visualization of biological data and the results of their processing.		
F7PBBEMP EI	lectromagnetic Fields of Living Organisms	KZ	2
Static and quasi-static elect	tric and magnetic fields, electromagnetic fields. Electrical and magnetic properties of biological tissues. Electrical, magneti	ic and electromag	netic stimulation
in medicine. Anatomical and	d physiological bases of bioelectromagnetism. Bioelectric sources and conductive environment. Integral relations of electr	odynamics of bio	electric fields,
electrodynamic aspects of r	mathematical modeling of electrocardiography and electroencephalography. Topographic concept of bioelectrical and bion	nagnetic measure	ments. Methods
and techniques of measure	ement. Human-robotic limb replacement interface.		
F7PBBRBL R	obotics in Medicine	KZ	2
Application of robotic princip	ples of medicine, ie medicine and laboratory technology. Description of the kinematic chain of robots with regard to their use	e. Explains their ki	nematic analysis
and synthesis. Thus, the inv	vestigation of the relationships between the position, speed and acceleration of individual kinematic pairs relative to the fr	ame of the chain.	And also the
action of the prescribed mo	evement (trajectory) of the end point of the chain. It introduces the methods of investigating the dynamics of kinematic cha	ins of surgical an	d manipulative
arms. Above all, it is a matte	er of finding such force effects in the drives of the kinematic pairs so that the end point of the chain performs the desired m	ovement. Furtherr	nore, the course
explains the most commonl	ly used paradigms of control of these arms. Especially in connection with the role of inverse kinematics and inverse dynar	mics. Due to the ir	nstallation, the
most frequently used sense	ors and actuators are listed, ie design and function. Finally, specific examples of the application of robotic principles of me	dicine will be give	n

## List of courses of this pass:

Code	Name of the course	Completion	Credits
17BOZP	Occupational Safety and Health, Fire Protection and First Aid	Z	0
F7PBBA3A	English Language IIIA (part 1)	KZ	2
The aim of the cou able to work activ	rse is to increase students' language competence in academic English and professional vocabulary, along with common communica ely with academic text, understand and be able to use basic terminology, and be aware of the different stylistic levels of English and lexical devices.	tion skills. Students the associated syn	s should be tactic and
F7PBBA3B	English Language IIIB (part 2)	KZ	2
Teaching in the sum	mer semester is based on a modern, non-frontal, project-based, and interdisciplinary way of teaching that is gaining prominence in t	he world. The syste	em is based
on the independent	creative work of students who are asked to develop an interesting topic in their field of study, i.e. biomedical engineering, and make	It available to their	colleagues
in the form of a proj	library.		in the lacuity
F7PBBAF1	Anatomy and Physiology I.	Z,ZK	4
Entry requirement	s of the course: Output knowledge, skills, abilities and competences: The course serves to understand the relationships between t	he structure and fu	unctions of
the human body. Th	the teaching follows modern pedagogical trends consisting in a direct connection between the morphology and the functions of organ	systems. Seminar	teaching is
motivation The u	e topics of lectures and connected with practical exercises. It focuses significantly on problems of program and uses activation methors of modern multimedia programs (eq ADAM and others) is a matter of course. From a theoretical and practical point of view, the m	paologies to increa	he on the
	morphology and function of vital organs and systems.		
F7PBBAF2	Anatomy and Physiology II.	Z,ZK	4
F7PBBALP	Algorithmic and Programming Theory	KZ	4
Algorithm, data stru	ctures. Identifiers, data types. assignment statement, conditional statement, cycles. Arithmetical and logical operations. Digital represent	ntation of numbers,	numeration
systems. Introduc	tion to structured programming in C language - building and structure of simple programs, creating of the user functions, user input a	and output, file mar	nagement,
types data sorting	and searching, implementation of basic numerical algorithms. Introduction to biomedical data processing - programmers view. Introdu	igoninin quality. At	engineering
F7PBBAZC	Algorithms for Biosignals in the C Language	KZ	2
Explain the principle	e and implementation of the most used algorithms for biosignal processing and their specific functional (and time and memory efficie	nt) implementation	n in C and C
++ in the form of pra	actically oriented interpretation and demonstration tasks. Graduates will be acquainted with specific solutions to basic algorithmic pro	blems in biosignal	processing:
with segmentation,	analysis in the time and frequency domain, with the design of linear digital filters (FIR and IIR) and with the visualization of results. P	rerequisites and co	o-requisites:
basic knowledge of	systems and signal processing, basics of ISO C. Output knowledge, skills, abilities and competences: The student is familiar with alg	orithms for prepro-	cessing and
convolution, etc. C	Can implement in C language the floating time window method for feature extraction and basic algorithms for the design and implement	entation of digital F	IR and IIR
	filters. Understands and can implement in C language the basic ways of visualization of biological data and the results of their pro	cessing.	
F7PBBAZD	Biomedical Data Analysis and Processing	KZ	2
F7PBBBB	Biomechanics and Biomaterials	Z,ZK	4
The course is inten	ded for all students who need to supplement their knowledge and have a general knowledge about biomechanics and its application	in specific practica	al problems.
subject and has ney	ver to be sufficient to understand alle issues in related subjects, especially the subject of mechanics and Robolics in medicine. If the ver had the opportunity to complete these basic knowledge, they will be exposed to the risk of misunderstanding the subsequent issues and the subsequent is the	es in related subject	choose the
,	this is not taken into account the basic knowledge.	j	,
F7PBBBCH	Biochemistry	Z,ZK	2
The student will b	ecome familiar with the basic areas of Biochemistry and understand the interrelationships between these areas. The learner will be	able to navigate bio	ochemical
concepts especia	Ily in the context of clinical biochemistry. The student will learn to work in the laboratory according to good laboratory practice, learn biological material and acquire good work babits. Ho/cho will be able to proceed interpret and discuss the results correctly	the specifics of wo	rking with
F7PBBBFT	Biophotonics	K7	2
Overview of princ	iples and applications in the interdisciplinary sphere, connecting physics, optics and biology. Interaction of laser radiation with matter	, interaction of rad	z ation with
tissue, biology basic	s, photobiology, bioimaging, basics of lasers, laser safety, optical biosensors, photodynamical therapy, optical manipulation with cells, na	notechnology for b	iophotonics,
	biomaterials for photonics.		
F7PBBBLG	Biology	Z,ZK	4
inorganic and organ	n clear knowledge of general and cell biology, through the formation of cells and organelles (endosymbiotic theory) and basic chemic vic substances, carbohydrates, fats, amino acids, biopolymers - NK and proteins), construction of non-cellular forms (especially virus)	al composition of (	prokarvotic
(bacteria) and euka	aryotic (plant, animal and fungal cells), they will get acquainted with cell metabolism (anabolism and catabolism), growth and cell diffe	erentiation, divisior	n (cell cycle
and its regulatory m	echanisms) until apoptosis and necrosis. They will get acquainted with the basics of microbiology (viral and bacterial diseases of mar	n) and applications	in technical
and medical fields.	He will gain detailed knowledge about the internal structure of a eukaryotic cell, its endomembrane system and semiautonomous orga	anelles and the pro	cesses that
take place in them	. Following in the field of molecular biology, they will get acquainted with the basic processes that are necessary for the implementati ration, translation (is proteosynthesis) and gene expression, the genetic code. In general genetics, with basic genetic to the second s	on of genetic inform	mation, the
passing genetic info	promotion from parents to offspring according to Mendel's and Morgan's laws, changing genetic information in the form of mutations a	nd possibilities of i	repair in the
cell. Human genetic	s (clinical genetics) includes basic examination methods and human genetic diseases (autosomal dominant, recessive, gonosomal dom	inant, recessive, m	itochondrial
and others). Follo	wing the great development of molecular biology and biochemistry techniques, the student is acquainted with genetic engineering ar	nd its methods of g	enetically
in modern	and their preparation, tissue cultures and biotechnologies. Applied biology in technical and medical fields describes the use of biologic technology and medicine. The conclusion consists of issues related to the field of animal cells and tissues, their histology and issue	al structures and n	necnanisms
F7PBBBLS	Riological Signals	7 7K	ι <u>y</u> . Δ
The subject deals w	ith origins and description of the most important electric and non-electric biological signals. The principles of generation, recording ar	nd basic properties	are studied
in all the signals. T	he studied signals involve native and evoked biosignals, including biological signals of the heart, brain, muscles, nervous system, au	ditory signals, visu	ial system,
signals from the gas	tro-intestinal system etc. Advanced methods of digital biosignal processing, spectrum analysis, modern methods of artificial intelligence	, features extraction	n, automatic
	ciassification, graphic presentation of results. Adaptive segmentation, artificial neural networks for signal processing.	7	1
Safety and Health n	contection during work; the role of the biomedical technician in clinical practice: risk-determining effects: patient environment: medical in	∠ solated system: ele	I ectric shock:
	types of distribution systems; protection classes; electrical inspections; regulations and standards; work with lasers		

F7PBBBP	Bachelor Thesis	7	6
Aim: Student work	under the guidance of a supervisor and possible consultant on a given BP topic, especially in the laboratory using knowledge and sk	ills from previous (	courses and
in the time allotted.	Course entry requirements: Prerequisite F7ABBMVP Research Methodology - This course is essential because it prepares students	to write a bachelo	r thesis and
how to prepare it	nethodically. Outcome knowledge, skills, abilities and competencies: The student is able to work on a given topic in a defined form, in	a defined time an	d is able to
work under the qui	ance of a BP supervisor and also in a team. The student is able to use knowledge, skills and knowledge from previous courses to sol	ve the assigned pr	roblem. This
is a Bachelor's thes	is, which is defended in front of the HSS committee. This thesis is assessed by the supervisor and the opponent according to the ECTS	S grading scale. Su	ibsequently,
	these evaluations and the result of the state final examination in the subject areas are included in one final evaluation.	0	
F7PBBCHM	Chemistry	Z.ZK	4
F7PBBDI7	Detectors of Ionizing Radiation	K7	2
F7DBBEBI	Ethics in Biomedical Engineering	74	2
Prerequisites: Knov	Linics in Diomedical Lighteening interesting systems and skills; basic concents and controversial to	 nics in biomedica	L theoretical
and applied ethics:	weape of school numerications appendix (primosophy, instor), payon longer how weape and shins, basic concepts and controversiant is be able to think critically in athical contexts: arrue and defend opinions in athical dimems situations; ability development of profession	al literature and d	
	of empathy.		evelopment
E7DBBELE	Electrophysiology	7 7K	2
Aim/objectives: to	Liection of solutions to the theory of electrical phenomena at the cell organ and organism level to the possibilities of measuring and	2,21 using these manife	∠ stations ∆
sub-objective is t	enable students to experimentally verify the knowledge. This course builds on Anatomy and Physiology I and II and requires a basis	knowledge of the	structure
(anatomy) and fu	oriting (hysiology) of the following systems (excitable tissues): nervous musculoskeletal circulatory (especially the heart). The cours	e deals with the pr	roblems of
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 pr	ocesses at
	different levels: cell, tissue, organ, organism.	5,	
F7PBBEM	Electrical Measurements	7.7K	4
Measuring of elect	ric values, principles, using, and parameters. Analogue measuring converters. Electromechanical measuring devices. Current and po	tential measuring.	Frequency
and shift phase me	asuring. Electric work and electric power measuring: direct current, single-phase and three-phase current. Electrical resistance and im	pedance measurin	a. Magnetic
measuring. Analog	ue scope. Digitalization, digital signal processing, signal reconstruction. Electronic measuring devices: multimeter, digital scope. Opt	electronic measur	ing device.
F7PBBEMP	Electromagnetic Fields of Living Organisms	K7	2
Static and quasi-sta	in the electric and magnetic fields, electromagnetic fields, Electrical and magnetic properties of biological tissues. Electrical magnetic	nd electromagnetic	stimulation
in medicine. Anate	mical and physiological bases of bioelectromagnetism. Bioelectric sources and conductive environment. Integral relations of electroc	lvnamics of bioeler	ctric fields.
electrodynamic asp	ects of mathematical modeling of electrocardiography and electroencephalography. Topographic concept of bioelectrical and biomag	netic measuremen	ts. Methods
	and techniques of measurement. Human-robotic limb replacement interface.		
F7PBBEO	Electronic Circuits	7.7K	4
The course provid	les a basic orientation in the principles of electronic circuits used in electronic laboratory and medical devices. It provides a prerequis	ite for the skilled o	peration of
analogue and o	ligital instrumentation. technology. Course entry requirements: Successful completion of Theoretical Electrical Engineering. Exit Know	, ledge, Skills, Abili	ties and
Competencies:	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.		
F7PBBESP	Management of Health Care Technology	Z,ZK	2
F7PBBEZP	Economics of Health Services	KZ	2
Methodology of m	anaging the economics of healthcare operations. The role of management and administration. Healthcare legislation and law, applica	tion of laws in a re	al hospital.
The role of manage	ment control and its role in the medical technology market, Planning strategies, analysis and research of consumer and organisational	markets, market d	levelopment
and positioning. A	im: economics of healthcare operations, which is the goal and guarantee of success and level of healthcare delivery. The course The	course provides a	knowledge
base for the PBB2E	SP course. Course entry requirements: Exit knowledge, skills, abilities and competencies: the student will be able to calculate interest	, inflation, annuity.	The student
	will therefore be able to be able to produce the economic part of a feasibility study.		
F7PBBFCH	Physical Chemistry	Z,ZK	4
The course is aim	ed at clarifying the physicochemical principles of topics related to the profession of biomedical engineer and technician in clinical pra-	ctice or research. T	The goal of
the course is to pro	ovide students with the fundamentals of physical chemistry as they occur and are applied in the design of medical devices, in clinical	research, or direct	ly in clinical
	practice. The course demonstrates the direct application of theoretical principles in practice.		
F7PBBFVP	Multivariable Calculus	KZ	2
The course is foc	sed at elements of calculus in two and more variables and at real, complex and functional series. Calculus in two variables: notion of	a limit and continu	uity, partial
derivative, differer	tial and its applications. Derivative of a composed function, derivative of an implicit function. Higher order derivatives, local extremes.	Constrained extre	mes, least
squares method. D	ouble and triple integrals, geometrical interpretation, Fubini theorem. Integration by substitution in double and triple integral. Complex s	equences, series	of numbers.
	Convergence of complex series. Functional series and their convergence, power series. Taylor series.		
F7PBBFY1	Physics I.	Z,ZK	4
Course Physics 1 is	s used to repeat and expand the basic knowledge of physics in the field of classical mechanics, thermals and optics, which is needed for	or further study at I	FBME CTU.
	Students will gain theoretical knowledge, the ability to solve numerical problems and practical skills associated with working in labo	ratories.	
F7PBBFY2	Physics II.	Z,ZK	6
The course Physics	s 2 follows the course Physics 1 and expands the acquired knowledge in the field of electromagnetism and the basics of atomic and n	uclear physics and	condensed
	matter physics.		
F7PBBHE	Hygiene and Epidemiology	ZK	1
F7PBBISZ	Information Systems in Health Care	Z,ZK	4
Lectures are focus	ed on the definition and clarification of individual subfields of medical informatics, the links of information systems to the organization	of health care, pay	yments and
controlling, the def	inition of IS users and their roles. The course includes the necessary overview of information technology and technical and SW resou	Irces for building Is	S. Attention
is also paid to the p	rinciples of coding and interpretation of medical data, data standards and communications. The individual types and properties of clin	ical, complementa	ary, hospital,
regional and mar	nagerial medical and medical IS are analyzed. The course also provides detailed information on the methodology of development, imp	plementation and s	support of
	large-scale information systems in health care.		
F7PBBITP	Integral Calculus	Z,ZK	4
The subject is an i	ntroduction to integral calculus and integral transforms. Integral calculus: primitive function, indefinite integral, properties and methods	of integration (int	egration by
parts and by subs	tutution, partial tractions), definite integral, properties, Newton-Leibnitz fundamental theorem, simple applications of both indefinite an	a definite integrals	, improper
integral, solving diff	erential equations (UDEs) (1st order UDEs with separable variables, linear 1st order homogenous as well as non-homogenous ODEs,	∠nd order linear h	omogenous
and non-homoge	enous ODEs with constant coefficients), intro to multiple integrals, particularly double integral and applications. Integral transforms: Laplace transform and their application for solving oth order linear ODEs with constant coefficients	place transform an	u inverse
		7 71/	~
		Z,ZK	2
vyznam a praktio	we μ islauv nasazeni iniorma nich a komunika nich technologii ve zdravotnictvi. Historie, zakladni struktura a rozdileni polita , mi	surerboard, SD rni	ve, BIUS,
výstupní portv /I	n, opera in parini , nasione a oop pevine usny, parini ove narty, zvunove narty, graincke narty, monitory, navesince, mysi, tiskamy a s SB USB-C HDMI DisplayPort Thunderbolt HDMI S/PDIF) RS232 iako virtuální COM port a jeho použití v pravi, modemv pej aet	iší sh rnice pro p	inoiování
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periferií v mikroprocesorových systémech (IIC, SPI), nej ast jší sb rnice pro komunikaci p ístroj a systém ve zdravotnictví, standardizace, opera ní systémy, mobilní platforma pro snímání, vyhodnocování a p enos dat, rozhraní Bluetooth, NFC, po íta ové sít , LAN, WAN, vrstvový referen ní model OSI, základní technické prost edky LAN (Ethernet, WiFi a jejich praktická realizace), Internet - prohlíže e, používané standardy a jazyky, úvod do architektury TCP/IP, protokoly a adresování, propojování lokálních sítí, brány a sm rova e, pojem server architektura klient-server nej ast ji používané protokoly sí ové architektury TCP/IP. HTTP, ETP, DNS, DHCP, VPN

	server, architektura kilent-server, nej ast ji pouzívane protokoly si ove architektury TCP/IP: HTTP, FTP, DNS, DHCP, VPN.		
F7PBBKZS	Conventional Imaging Systems	Z,ZK	4
F7PBBLAD	Linear Algebra and Differential Calculus	Z,ZK	6
Differential calculus	consists of: sequences and their limits. Functions of one real variable, their limits, continuity, derivatives. Local and absolute extremation	a of a function of o	ne variable,
	investigations of functions. Taylor-polynomial.		
F7PBBLPZ1	Management of Health Care Technology	Z,ZK	4
Overview and categ	orization of medical (diagnostic devices) according to international directives (EU directives), including correct terminology. The electric	al safety of medica	
activity (ECG) - e	ectrocardiographs, vector cardiographs; Blood pressure monitors - NIRP; Blood pressure measuring instruments - IRP PCWP; Diluti	ion measurement of	ac electrical
output. Swan-Ganz	catheter: SpO2 pulse oximetry: Vital signs monitors, central monitoring systems. Special monitors for clinical practice - cardiotocographs	. NIRS. BIS: Electro	bir cardiac
methods in clinical	practice - a measurement of respiration by impedance method, EIT; Measurement of brain bioelectrical activity (EEG); Measuremen	t of muscle bioeled	ctric activity
	(EMG); Spirometry; Examination of the auditory system; Simulators and testers of diagnostic equipment.		
F7PBBLPZ2	Medical Devices and Equipment II. (Therapeutical Devices)	Z,ZK	2
F7PBBLT	Clinical Laboratory Instrumentation	Z,ZK	4
F7PBBMAT	Marketing of Medical Technology	KZ	2
F7PBBMAZ	Management and Admininistration in Health Care	KZ	1
F7PBBMDT	Microwave Diagnostics and Therapy	KZ	2
Interaction of the	EM field with biological tissues and its use in diagnostics and therapy. Numerical methods suitable for modeling these interactions. B	asics of microwav	e imaging
(MWI). Perspectiv	re application of microwave techniques in medical diagnostics: non-invasive monitoring of blood glucose concentration, microwave de	etection and classi	fication of
cerebral vascular ev	vents and early detection of breast cancer. Therapeutic systems and applicators for microwave and RF local and regional hypertherm	ia. Planning treatm	nent. Design
	and testing of applicators.		
F/PBBMEC	Mechanics	Z,ZK	4
replacement Equili	acquainted with the following areas of mechanics. General physical equations, newton's laws, statics and dynamics. Force and mon	systems - motion i	iposition,
spatial and planar c	onstraints solution of reactions. Static moment center of gravity and center of area. Spatial moment of inertia - kinetic energy of rotati	ional motion produ	ict moment
momentum, law of o	conservation of momentum. Second moment of area - product moment, polar moment, Mohr circle, main moments of inertia, ellipse of	of inertia. Internal s	static effects
- beam, system of	plates, course of internal static effects, kinematic method, statically indeterminate problems. Mechanical properties of materials - tes	sts of mechanical p	properties,
stresses and de	oformations, Hooke's law. Stress and strain - uniaxial and biaxial stress state, simple bending, bending curve, torsional stress, cross-state, stress, stress, stress, cross-state, stress, cross-st	section design, thir	n-walled
cross-sections, com	bined stress, nonlinear models. Buckling strength - critical load, stability of members, calculation of cross section. Tests of hardness, adl	nesion, toughness,	tribological.
F7PBBMFJ	Physical Phenomena Modeling in COMSOL MULTIPHYSICS	KZ	2
Numerical simulat	tions are increasingly being used to develop new and optimize existing products and devices. Numerical simulations can greatly redu	ce the number of p	prototypes
needed and thus sig	gnificantly accelerate and reduce development costs. Another sector where numerical simulations are used is a sector where it is different back back on numerical simulations are used in a sector where it is different back on the sector sector where it is different back on the sector sector sector where it is different back on the sector se	icult to verify ongo	ing physical
knowledge of mater	ial properties, we can define the amount of power delivered to the device (equiration requency ablation in oncology or cardiac surgery)	Computer model	ing involves
the creation of geon	netry, setting of material properties and boundary conditions and, last but not least, the choice of differential equations, the method of	discretization of the	e computing
area and the proce	essing of results. The accuracy of the results obtained, the length of calculations and the computational power requirements are very	dependent on the	numerical
model setting. The I	ectures cover the most common problems in electrical engineering, thermics, mechanics, chemistry, acoustics and fluid dynamics. T	he acquired knowl	edge will be
	tested by the students when designing individual parts of devices and devices.		
F/PBBMS	Modelling and Simulation	Z,ZK	4
models physiol	consequences of modeling and simulation. Be able to use modeling and simulation methodologies. Emphasis is placed on a molodign of porcal models, pharmacokinetics, Furthermore, continuous and discrete models of population dynamics, epidemiological models, mo	iderstanding of cor idels of venereal d	iseases
F7PBBMT		7	1
Attendants are ma	ade acquainted with particular terms flowing from latin but also greek expressions during their lectures. Students are continuously inf	ormed about term	s of whole
	diagnosis and therapeutical procedures. Education is combined with continuous knowlegde check up through the use of test	ts.	
F7PBBMTB	Microprocessors in Biomedicine	KZ	2
We will explain the	principle and building elements of a microprocessor system, the structure of a microprocessor, the connection of basic peripherals,	the programming	model of a
microcomputer sys	tem in the form of a practically oriented explanation and demonstration tasks. Provide a basic overview of ATMega and ARM Cortex	M architectures wi	ith practical
examples of their j	programming with examples of use in biomedicine. Prerequisites and co-requisites: basic knowledge of digital technology and signal	processing, basics	s of ISO C.
configuration and	skills, abilities and competencies. The student is raminal with the selection and design of microprocessor system solutions for use in program control of these building blocks of the microprocessor system; digital inputs and outputs. A / D and D / A converters, serial	and narallel comm	unication
counters and timers	s. interrupt controller. Understands the basics of communication of microcomputers with the environment: interfaces for LCD displays.	. kevboards. RS23	2. Ethernet.
	WIFI, Bluetooth, XBee and mobile 3G / 4G communication, GPS / GLONAS localization.		, ,
F7PBBMVP	Research Methodology	KZ	2
The course introd	luces students to the basic methods of research work and the requirements for scientific communication. The course also introduces	students to the pri	nciples of
	writing and presenting of bachelor's thesis.		
F7PBBNMP	Project Proposal and Management	KZ	2
As part of the lectu	ures, students will become familiar with topics such as project management (PM) according to IPMA, the certification process, project	t, program, portfol	io, phases,
and the project life	e cycle, as well as project initiation. They will learn about the feasibility study, project initiation, project identification document, and log	gical framework. O	ther topics
Include an Introdu	ction to project planning, scheduling, risk and risk analysis, project implementation, benavioral competencies in PM, project closure,	and evaluation. St	udents will
study, identification	document, logical framework, WBS (Work Breakdown Structure a hierarchical structure of tasks or activities). scheduling risk analysi	s, project impleme	ntation. and
a final test. As par	t of this course, students have the opportunity to obtain the IPMA Level D certification, which is intended for aspiring project manage	ers, project coordin	ators, and
	team members. The certification is valid for five years.		
F7PBBOIZ	Protection Against Ionizing Radiation	ZK	2
F7PBBPMS	Probability and Mathematical Statistics	Z,ZK	4
Objectives: to famil	iarize students with the basic principles of the theory of probability and mathematical statistics. Pre-requisites and entry requirement	s of the course: Kn	owledge of
mathematics (lin	ear algebra, differential and integral calculus) in the range of F7PBBLAD and F7PBBITP courses taught in the first year of study. Kno	wledge, skills, abi	lities and

to practical problems that arise in other areas of professional work and can explain them sufficiently (e.g. doctors). The student is familiar with the basic methods of inductive statistics

	and can choose a suitable method for standard statistical problems.		
F7PBBPNK	Design and Construction of Medical Devices/Practical Exercises	KZ	4
The aim of the pra	actically oriented course is to acquaint students with the design process of the measuring part of the device, ie basic problem analysi	s, determination of	functional
blocks and their de	esign, selection of suitable components and their values with emphasis on working with catalog sheets and application recommendation	tions, preparation c	of electrical
documentation and	d board design, printed circuit board, its mounting, soldering and revitalization. During the course, students will implement a functional technology of the sold and the so	a device (mounting	, soldering,
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 environm	ent FAGI F
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.
T	he 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.	
F7PBBPP	First Aid	KZ	2
F7PBBPPM1	Programming in Matlab I.	KZ	1
Students will learn	how to use Matlab, get knowledge of data structures and with data and working with data and their display. During the semester, they	will gain knowledge	e of creating
	scripts in Matlab and the basics for their use in the processing of biomedical data.		
F7PBBPPM2	Programming in Matlab II.	KZ	2
The aim of the cour	se is to understand the topic of scripting languages and their applications, to understand their advantages and disadvantages and their advantages advantages and their advantages and their advantages and their advantages and their advantages advantages advantages and their advantages advantages advantages advantages and their advantages advantages advant	r complementarity	with system
languages. Studen	the scripting languages within the scripting languages by thon	the Onix operating	System and
F7PBBPPP	Programming Tools	K7	2
The aim of the cour	se is to provide an overview of basic application software for GNU / Linux and MS Windows with examples and examples of use, includin	ng a comparison of	parameters
of individual progr	ams. The areas of focus of individual program resources are selected with regard to the usability of FBMI students in other subjects a	and also in the pre	baration of
qualification work	s and in subsequent professional employment in the field. The entry requirements of the course are knowledge of computer control a	t the secondary sc	hool level.
After completing th	e course, students will gain the following output knowledge, skills, abilities and competencies: Routine control of common user progra	ams in MS Window	s and GNU
/ Linux, measured i	n the following areas: creation of technical documentation, processing of 2D graphics, audio, video, secure information sharing and nei	twork communicati	on, creation
EZDDDDDC	and publication of personal web pages, processing and visualization of biomedical data, basics of scripting.	774	2
Patient and instrum	FACIENT AND DEVICE SIMULATORS AND TESTERS	∠,∠n   ntation of a selecte	∠ d model of
a subsystem. Desid	in and implementation of patient and instrument simulator sub-blocks. Examples of circuit implementations of simulators and testers. E	Environment, scena	ario creation
and other related	d 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.		
F7PBBPSL	Psychology	KZ	2
Development, meth	odology and methods of psychology. Mental activities and psychic processes, psychology of personality, objects of psychology and the	eir formation and de	evelopment.
technicians and m	edical doctors, technicians and patients, technicians and nurses. Communication as a tool for good cooperation amongst people and	d an aid to interacti	ons. Basic
expression and	communication skills. Use of elocution and gestures in personal expression. Verbal and nonverbal communication. Dialogue; types of	dialogue, questior	is during
	dialogue. Model situations. Communication process as part of economics - components, tools and functions.		
F7PBBPTI	Principles and Practice in Tissue Engineering	KZ	2
F7PBBRBL	Robotics in Medicine	KZ	2
Application of robot	ic principles of medicine, ie medicine and laboratory technology. Description of the kinematic chain of robots with regard to their use. Ex	cplains their kinema	atic analysis
and synthesis. I h	us, the investigation of the relationships between the position, speed and acceleration of individual kinematic pairs relative to the fran	ne of the chain. An	d also the
arms Above all it is	s a matter of finding such force effects in the drives of the kinematic pairs so that the end point of the chain performs the desired move	ment Furthermore	the course
explains the most	commonly used paradigms of control of these arms. Especially in connection with the role of inverse kinematics and inverse dynamic	cs. Due to the insta	llation, the
most freque	ently used sensors and actuators are listed, ie design and function. Finally, specific examples of the application of robotic principles of	medicine will be g	iven
F7PBBROP	Guided Practical Training	Z	2
Familiarization of	students with the organization and provision of professional internships at the clinical workplace. Provision of contractual documents	for the implementa	tion of the
ROP (supervised	professional practice). The ROP will then enable the acquired practical skills and habits to be applied in the key subjects of the 3rd y	ear. The student th	us has an
overview of the c	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	n apply legal require	ements to
F7PBBSBP	Bachelor Thesis Seminar	7	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 Te	echnology Bacheld	r'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 committee.	Course entrance re	quirements:
Prerequisite F7PBE	BMVP Exit Knowledge, Skills, Abilities and Competencies: Students are fully aware of the requirements for the requirements of profession	al reports and comr	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, appl	y scientific researc	h methods
	to specific assignments. They present their proposed solutions and results, are able to interpret the results.	7 71/	-
F/PBBSEL Basics of power of	POWER Engineering	C,ZK	5 In 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 u	Inderstanding, kno	wledae will
· · · · · · · · · · · · · · · · · · ·	be verified on practical examples and in the laboratory.	, , , , , , , , , , , , , , , , , , ,	
F7PBBSJ	Scripting Languages	KZ	2
The aim of the cou	rse is to understand the topic of scripting languages and their applications, to understand their advantages and disadvantages and the	eir complementari	y to system
	languages. The course focuses on scripting languages in the Unix operating system and Python scripting languages.		
F7PBBSM	Sensors in Medicine	Z,ZK	4
This subject provid	des information about basic electronic devices - sensors, describes their operation principle, basic circuit configuration and applicatio	n. The stress is aid	mainly on
sensors (force pre-	morples and practical utilization, integral part of tills course is pasic information about sensors of non-electric quantities and their rea ssure, torque, vibration, displacement, acceleration etc.) magnetic field sensors, temperature sensors, chemical sensors, ontical sens	ors and biosensors	The stress
	is aid on miniaturization, integration		
F7PBBSPR1	Semestral Project I.	KZ	1
The topic of the ser	nester project (SPR1) must be in the field of biomedical engineering and must be related to the study field of the same name Biomec	lical Technician. Th	e topics are

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

F7PBBS/R2         KZ         4           The main due is its instruments and project management. Creation of presentations and written tests. Yoography uies. Types, purpose and regulations and written tests. Writing and the main due is its instruments and the presentations and written tests. Types, purpose and regulations due to the course is the incommon test outpresentations and written tests. Types, purpose and regulations due to the course is the incommon test outpresentations and written tests. Types, purpose and regulations due to the course is the incommon test outpresentations and written tests. Types, purpose and regulations due to the course is the incommon test is the incommon test outpresentation due to the course is the incomparison of the COUP and meeting exceptions of the course is the incomparison due to the course is to incapate transdue to the course is to incapate transdue to due to the course is to incapate transdue to due to the course is to incapate transdue to due to the course is to incapate transdue to due to the course is to incapate transdue to due to due to the course is to incapate transdue to due to the course is the outpress on technical pacetos and a deal due to due to due to due to the course is the incompared term income test outpress. Course every needs to the course is the incommon test outpress. The course is the incompared test outpress. The course is the course is the incompared test outpress. The course is the course is the course is the incompared test outpress. The course	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 an	ust always
The mark tesk is bits or with on a project which can be requested in time and finish as a Borheor Presst. The next well be discusses topic organisments of schedular presentations and attention of the PROLECTS distances - http:/projects.mini.cou.co.During the term, there as disclands 2 hourse well well well to work in other targets and there press the other targets and there press and there	F7PBBSPB2 Semestral Project II	K7	4
stills. Fucketing tearmore and organized management. Creation of presentations and written tests. Typingrupt, nass. Types, purpose and regularized and the PROLES database - http://project.Bit mail section of the PROLES database - http://project.Bit mail sections and the recuprent. Another cogicities of the course is to introduce and the organized mail framework and the recuprent. Another cogicities of the course is to interdice and the sections and project. Course entry the advectors and the recuprents and other cogicities of the course is to interdice and the recuprents and other cogicities of the Course entry the advectors and the recuprents and software cognities and the sections and the record of the Course entry the advector and the record and the record base database of the record and the r	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 or	pmmunication and p	resentation
technical tests. Writing a commented bibliographic search. The student solvers topic (project) from the selected argumentary.  F7PBBSPT Research Methodology ZZK   4 Pharmain degrees of the course is to induce students to the user suprovisition, which tests argumentary and the parts and there parts and there and the selected arguments. These arguments are basic engineered by thesis, chrentering and their parts and there parts a	skills, including teamwork and project management. Creation of presentations and written texts. Typography rules. Types, purpose and requirements of	of technical presenta	tions and
Image: TPIEBSP         Research Methodology         Z.ZK         4           The man abjective of the course is to introduce students to the basic explorment of introluce care units (ICU) and anesthesiotigy and derighteesing to the course is to introduce students to the basic explorment of introluces and the explorment introluced interview of autocourse is to introduce students to the basic explorment of introluce care units (ICU) and anesthesiotigy and engineering interview of particular explorments.         2         2         2         2         2         2         2         2         2         2         2         2         3<	technical texts. Writing a commented bibliographic search. The student solves topic (project) from the selection of the PROJECTS database - http://pr	ojects.fbmi.cvut.cz D	ouring the
F7PEBSPT         Research Methodology         Z,ZK         4           The main digitary of the course is to introduce sudents to the baics upplement of intensive caru unts (CU) and anesthesiology and resuscitation for degrateering (modeling, cluttheory, persuance). These are devices to intensive intensives and the parts and obter supplement. Another objective of the course is to intensive intensives and intensives and the parts and obter supplementation of functional section.         etc) in the analysis of discustes for the following and intensives and the parts and obter supplementation of functional section.         etc)         Research (LU) and analysis of discustes and the parts and obter supplementation of functional section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and analysis of discustes and a section.         Research (LU) and (LU	term, there are dedicated 2 hours every week for work under teacher supervising.		
The main dejective of the course is to introduce students to the basic equipment of intensive care units (CU) and anesthesiology and engineering characteristic of basic basics of the course is to intergate knowledge and stills of students from the fields of science (especially physics, chemistry and physicology) in and engineering incluit theory, pneumatic elements, etc.) In the analysis of cluid elemokary and in the design and implementation of functional technical systems. The analysis of cluid elemokary and in the design and implementation of functional technical systems. The analysis of cluid elemokary and the cluid engineering and an enterget set of the source is to give students abis overview of audiology. It cluid elemokary and the cluid engineering and an enterget set of the source sets of the students and encircle in audiology in relation to normalia in an interview of audiology in relation to more in cluical practice in audiology in state an integrit of this goal, workplace. Course entry requirements are soletone, brained and the cluid in a function in the cluid encircle (structure, relevas), cleinary and and uncircle), neurogian encircle in audiology in encircle in audiology in relation to function of the CNS. Internal encircle cluid encircle, relevas, there were successive average in the sole and cluicate in the sole and the cluid encircle (structure, relevas), stream control, sensor prevous system - more system, more encircle, stream cortex is space. Cluid encircle, relevas, the sole average is a space in the sole and cluicate in th	F7PBBSPT Research Methodology	Z,ZK	4
are devices to support vital functions, especially jung ventilation, as well as patient monitors, anesthesia machines and their parts and cher equipment. Another objective of the course is to intrograte forways and in the design and implementation of functional technical systems.          Er7PBETA      Technical Audiology     KZ     Z     Z     Z     Technical Audiology     Itel as a system of the course is to align at the system of the course is to align at the market is an entite interval system. Finance requirements are expressed as prerequisites and a detailed breakdown of the requirements is as follows: - morous system, spinate interval, entities and interval system. These requirements are expressed as prerequisites and a detailed breakdown of the requirements is as follows: - morous system. Finance (start) curve, reflexes), basid gangia (structure, reflexes), cereboal corrections systems, spinate interval, entities and interval system. These requirements are appression theritogical presents, presentation and function of the CNS, international system, brain and interval system. These requirements and problem presention, runnoval and decrete lines system deternation of the course is the system and their parts and the system and their description harronic and analysis. Fourier transmotion for continuous and discrete lines system deternation for the continuous and discrete lines system deternation for continuous and discrete lines system deternations of the continuous and discrete lines system distribution at zero and poles. Item characteristics - obseable. The continuous and discrete lines system differential system and their optical systems deternation of continuous and discrete lines system differential system and their deternations Brace system and their parts and non-invest system - distribution of discrete system and their parts and non-invest system dinstructure, reflexes system dinstructure, r	The main objective of the course is to introduce students to the basic equipment of intensive care units (ICU) and anesthesiology and resuscitation de	partments of hospita	als. These
is to integrate knowledge and akils of students from the fields of science (especially physiolog) and engineering (modeling, circuit theory, prevunatic elements. act, in the analysis of circuita technology and the design and implementation of huncincal technology in relation theory, and and major hearing, and all their in an intervelated context with emphasis on technical aspects. Motivation to work in clinical practice in audiologi is also an intervelate and their in an intervelated context with emphasis on technical aspects. Motivation to work in clinical practice in audiologi is also an intervelate and the expressed as preventises and a requestion to inclinical practice in audiologi is also an intervelate spin encode system - notor system - notor system - notor system - necesptors, asis encodes on the evolution of the CNS, internal environment of the CNS (block-bran harrie, carebasping locature, reflexes), hosting discutture, reflexes), excellation (structure, reflexes), basis and previous system - necesptors, size and neuronal system, spin encode system, spin encod	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
FPRBETA         Technical Audiology         KZ         2           The aim of the correls is by estudents a basic onverted or bakic howeldsge of biology, medicine and technology in reliation than and and major the energy and this part. workplace. Course and this in an interrelated contrast with emphasis on technical aspects. Metivation to work in clinical practice in audiologi is also an interrelated contrast, workplace. Course and the internel and the explanation of the CNS (blood-brain barrier, carebousphalle breakdown of the requirements is suppartial course, effective, leaden) interrution, transport and function), neurous system, solical cont function, enerous system, brain adem, by part and and the interrelated contracts. The explanation of the CNS (blood-brain barrier, carebousphallen, transport, enerous, system, and the explanation of the CNS (blood-brain barrier, enerous explanation, interrution and discrete lines system. and the explanation of the CNS (blood-brain barrier, weres, types of were, suscessite were, interference, standing avers, sound, -types of signalis, basic signal operations, signal docomposition, - harmonic analysis, Fourier transform for continuous and discrete lines system. Aident systems, solutice computer conversion duration, transport functions, frequency mag and bards, a Biological data acquitificential equalitors, transform for continuous and discrete lines system. Standing avers, sound, -types of signalis, basic, distribution of zeros and poles, ime characteristics, -couping of systems, beetback loops, - Characteristics of table contents, the signal appreciation, and avers, and adverse and table content termination and transports and transports and adverse signal appreciation of adverse and standing avers, and adverse and standing avers, and adverse and standing avers, and adverse adve	is to integrate knowledge and skills of students from the fields of science (especially physics, chemistry and physiology) and engineering (modeling, circ etc.) in the analysis of clinical technology and in the design and implementation of functional technical systems.	uit theory, pneumatio	elements,
The ain of the course is to give students a basic overview of autology, i.e. basic knowledge of biology, medicine and technology in relation to normal and impaired hearing, and all this in an integral part of this is au investment and impaired hearing. The students and the expressed as prerequisites and a detailed treakdown of the requirements in as follows - nervous system - organisation and function of the CNS, includents of the CNS (buckbarn in barrier, enterpoints), nareout and function, nervous system - previous system - requires the comparison of the CNS, buckbarn and particular to enterpoints, in streams, nonvenent and an aposition preceptions, which hearing tutes, smell pair, autonomic nervous system - requires the streams and the previous system - requires the streams and the streams and the streams and previous and discretions of autonomy and discretion streams streams - differential/differential express, previous system - requires the streams and the str	F7PBBTA Technical Audiology	KZ	2
this an interested context with emphasis on technical aspects. Motivation to work in clinical practice in audiology is side an integral part of this goal. workplace. Course entry equirements: These requirements: These requirements in the CNS (blood-brain barrier, cerebrosgn) afformation, transport and function), neuroglia, motor nervous system, spinal cord (structure, reflexes), envolution of the CNS. (blood-brain barrier, cerebrosgn) envolution, reflexes), careford signalis (structure, reflexes), careford signalis (structure, reflexes), basic signal operations, spinal cord (structure, reflexes), basic signal operations, signal decomposition, - harmonic and pasis, Porierit transform for confinuous and discrete isignals, DFT, FFT, convolution, - types of signals, basic signal operations, signal decomposition, frequency characteristics, distribution of zeros and poles, time characteristics, - coupling of systems, feedback loops, - Characteristics of basic biosgnase EQ, ECG, EOG, EPE MG, artelacts, origin, sources, diagraves and construments, transfert motions, frequency characteristics, and thesis of auditory threes signals, DFT, FFT, - convolution, - types of signals, and harring attack and regulater environ chain, AND, thesis and completences Students will be able to earnet, and the able do circum and hards in device the indived audical systems, including technical principle, instrumentation and students the field of audical systems, including technical principle, instrumentation and environ the so-called certified course, which, according to Act 95/2004 Coll, allows for the acquilation of the so-called certification of auditory. Microbia and add to the the coll audicology operation of signals. The source and electrical spatial professional completences Biomedical technicia under the Act.	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	ig, and all
requirements: These requirements are expressed as prerequisites and a detailed breakdown of the requirements is as follows: nervous system - nervous system - nervous system - nervous system - motor system, brainstem (structure, reflexes), correbelium (structure, reflexes), correbution, technical and nervous system. Provide System - nervous syst	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. Cours	se entry
Internal anvironment of the CNS (blood-crain barrier, cerebrospinal formation, transport and function), neurogia, moor herevous system, spania cord (structure, reletexe), barsolitogy of movement to control - sensory nervous system. Treates (functure, reletexe), barsolitogy of movement to position perception, vision, hearing, taste, sensory nervous system, brain stem, hypothalamus, signal discomposition - technical and biological systems, sound - types of systems, sound - types of systems, stema and hearing averses, sound - types of systems, frequency thanks, fourier transform for continuous and discrete signals, DTT, FTT, - convolution, transfer functions, frequency tharacteristics, distribution of zeros and poles, time characteristics, rouging of systems, beedback loops Characteristics of basic biological systems, systems and their description, financy area and hearis, area differential equationis (FT, - convolution), frequency tharacteristics, distribution of zeros and poles, time characteristics, rouging of systems, beedback loops Characteristics or basic biological systems, systems and their description, flexen and conductions, flexing therential dirichlexing, francing area and hearis, frequency tharacteristics, and their description (Darios), including tractice, and poles, time characteristics, rouging of systems, beedback loops Characteristics of basic biological systems, systems and methods used in clinical practice, and carcular the heir dia dualidogy using mataduation and to add to the incluvele and advard wave, and hearing aids and replacements. The budies that accurates hearing and the so-called certificate or audiograf, special professional competence Technical audiologis after accurate, the family and discriptions, including technical principies. Instrumentation and methods used in the concurse (Linear Darios), and the matedian certificate and audiograf, special professional competence and basic and practical approace and the so-called certificate or audiograf, the accurate the family audi	requirements: These requirements are expressed as prerequisites and a detailed breakdown of the requirements is as follows: - nervous system - organi	sation and function o	of the CNS,
system: initial system; functions; indicates; initials; isolation; initials; isolation; initials; isolation; initials; isolation; initials; isolation; iteration; iteratiteration; iteration; iteration; iteration; iterati	Internal environment of the CNS (blood-brain barrier, cerebrospinal formation, transport and function), neuroglia, motor nervous system, spinal cord (	structure, reflexes), ·	- nervous
peripheral compartments: sympathetic and parasympathetic,waves, types of waves, successive waves, interference, standing waves, sound types of signals, basics signal operations, signal accomposition, technical and holiogical systems, systems and their description - forcinuous and discrete signals, DFT, FT, convaluation, technical and holiogical systems, systems and their description - forcinuous and discrete signals, DFT, FT, convaluation, technical and holiogical systems, systems and their description - forcinuous and discrete signals, DFT, FT, convaluation, technical and biological systems, systems and their description - forcinuous and discrete signals, DFT, FT, convaluation, technical and biological systems, systems and their description - forcinuous and discrete signals, DFT, FT, convaluation, technical and biological systems, systems and their description - forcinuous and discrete signals, DFT, FT, convaluation, technical systems, the systems, the systems, technical practice, situations, Parachetistics, conversion errors, signal conditioning, aliasing, fittering, trends, sensing options. Output knowledge, addia-addia instrumentation and methods used in clinical practice, situation and to advanced skills within the framework of the so-called certificate of audioogy "Special professional compatence Technical audioogis of the source and technical practice, advanced skills within the framework of the social and electricial splitation and to advance advalles and practice splitation, is allowed by the advanced skills within the framework or circuit. Biothical curves in semiconductor, type of the conductive, restore and insplators, appropriate in the force and subscription of controls including the conce and the source, neurod and the source, mutual localing of the source and traves and the conce site of the contract sis the conductive, restore fragmental splates	control - sensory pervous system - recentors skin sensation movement and position percention vision bearing taste smell pain autonomic pervous system	tem brain stem byn	othalamus
signal decomposition - harmonic analysis. Fourier transform for continuous and discrete isgnals. DFT, FFT, - convolution, - technical and biological systems, system and their description in for acros and poles, time characteristics, - coupling of systems, feedback loops, - Characteristics of basic biologinals EEG, ECG, ECG, EP, EMG, artelests, and subsition and preprocessing, basic computer conversion chain. AD convertes, problems signal sampling and quantization, Nyasit theorem, conversion chain. AD convertises, problems signal sampling and quantization, Nyasit theorem, conversion cross, Signal conditioning, trends, semigling 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 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 certificate or set. In the source, much status and transfer functions, the source and leading to predictions. The roy 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 appliance, impedance intenders, dive of works of the societ, frequency domain. Transiston: Indiport transistors without complementary vidooutist, diverse fields (function), magnetization, force effect, Electromagnetic away, spreading and functional preprocessing, properties in the forward and reverse direction. Bipolar transistors on the LC circuit. Electrical current is mentioned. (Functional preprocessing), properties in the forward and reverse direction. Bipolar transistors and preprincips. Secondard and treversed inecintic bipolar transistors. Mipolar transistors with	peripheral compartments; sympathetic and parasympathetic, - waves, types of waves, successive waves, interference, standing waves, sound, - types of s	signals, basic signal (	operations.
description, linear and non-linear system external description of continuous and discrete linear system - differential dindifferential difference	signal decomposition, - harmonic analysis, Fourier transform for continuous and discrete signals, DFT, FFT, - convolution, - technical and biological	systems, systems a	nd their
distribution of zeros and poles, time characteristics coupling of systems, feedback loops, - Characteristics of basic computer conversion chain, AD converters, problems signal sampling and quantization, Nyquist theorem, conversion errors, signal conditioning, alasing, 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 entried susce), lean about these issues, lean	description, linear and non-linear system, - external description of continuous and discrete linear system - differential/differential equations, transfer funct	ions, frequency char	acteristics,
diagnostic applications, frequency range and bands, - Biological data acquisition and preprocessing, basic computed on the sum on version entrar, signal conditioning, aliasing, filtering, trends, semiging applications, the version chain, A/D converters, problems signal sampling and quantization, Myutius theorem, conversion entrars, signal conditioning, aliasing, filtering, trends, semiging approximate and singulates and the solution of the solution the solution of the solution of the solutis the solution	distribution of zeros and poles, time characteristics, - coupling of systems, feedback loops, - Characteristics of basic biosignals EEG, ECG, EOG, EP, E	EMG, artefacts, origin	n, sources,
quantization. Nyquist theorem, conversion errors, signal conditioning, alisaing, filtering, trends, sensing optiones. Output knowledge, skills, abilities and competences. Students will acquire a basic understanding of acoustics, measurement and diagnosis of auditory functions, including technical principes, instrumentation and stuwes, and hearing alids 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 stuwes, and hearing alids and cincle practice, as well as motivated and ready to relear the field of audiogy going graduation and to add to this knowledge and advanced skills within 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 of the conclust indexing of the so-called applicate. Impedance matching. Properties of circuits in time and frequency domain. Transient action in DC circuits, frequency characteristics of the LO circuit. Electrical acytical applicate. Impedance matching brows rod diverse direction. Bipolar transistor - transistor direct magnetic acresting, properties in the forward and reverse direction. Bipolar transistor - transistor of signals. Electromagnetic wave, spreading, interference, electromagnetic wave, structubal scheller bergendare and applicate. Impedance and applicate imperies and express basic principles.         FYPBBT2S       Tomographical Imaging Systems       Z_ZK       4         CT systems (basic principle, schematic arrangement system, basic physical phriciple, developmental generations, basic principles of reconstruction. Imaging systems (border) within	diagnostic applications, frequency range and bands, - Biological data acquisition and preprocessing, basic computer conversion chain, A/D converters,	, problems signal sai	mpling and
acquire a basic understanding of acoustics, measurement and diagnosis of auditory functions, including technical principies. Instrumentation and software, and hearing aids and 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 critificate of audiology <sup>1</sup> . Special professional competence Technical audiologist after graduation, i.e. after obtaining the so-called professional competence Biomedical technician under the Act.           FYPBBTEL         Theory of Electrical Engineering         Z,ZK         4           Electric current. Dict and Ac currents. Electrical curcuits including R, L., C Power of electric current. Unstrumental edition of electrical energy. Connection of the electrical systems. Input resistance and impedance, idle voltage, inner resistance and impedance of the source, mutual leading of the source and electrical appliance, impedance matching. Properties of circuits. Electrical curcuits including R, SOUSS. Electromagnetic effects (induction, magnetization, force effect). Electromagnetic wave, spreading, interference, electromagnetic effects (induction, magnetization, force effect). Electromagnetic wave, spreading, interference, strustour effect, and specially listoratory exercises principles.         Z/K         4           CT systems (basic principle, schematic arrangement system, basic physical principle, developmental genetization, force effect). Electromagnetic wave, spreading, interference, strustour effect, and specially listoratory exercises principles           F7PBBTZS         Tomographical Imaging Systems         Z/K         4           CT systems (basic principle, schematic arrangement system, shasic physical principle of methods their scanning, digitation and subseque	quantization, Nyquist theorem, conversion errors, signal conditioning, aliasing, filtering, trends, sensing options. Output knowledge, skills, abilities and	d competences: Stud	dents will
Tepsetements. The students wind be able to orient thereinselves. They wind be able to heart about these issues, elefant about dives is actes of meducal misu dimension and methods used in clinical practice, as well as motivated and ready to enter the field of aduiology upon graduation and to add to this knowledge and advanced skills within the framework of the so-called certified oruses, which, according to Act 96/2004 Coll., allows for the acculation of the so-called "certificate of aduiology". Special professional competence Technical audiologist after graduation, i.e. after obtaining the so-called professional competence Biomedical technician under the Act.         F7PBBTEL       Theory of Electrical Engineering       Z,ZK       4         Electric current, DC and AC currents. Electrical ourcuits including R, L. C. Power of electric current, thermal effect of electric current in securical appliance, impressions, impedance, dive voltage, inner resistance and impedance of the source, mutual loading of the source and electrical appliance, inclusional carl, increasing and reverse direction. Bipolar transistor is chasci principile in elementary oricul. Unjoint transistor unagnetic compatibility, Soft and hard magnetic materials. Transformers construction and parameters. Magnetic recording and reproduction of signals. Electromospressions properities of the source and properities of reconstruction). Imaging systems magnetic resonance. PET and SPECT principle. Specifies of creating image data used in medicine, the principle of methods their scanning, digitization and subsequent processing, on the principle of function and properities of scanning image means in context, which is important especially in three of discription. Emphasis is placed on the external and internal discription of linear dynamical systems. Subplex and escription. Emphasis is placed on theoruse is focused on aduioning systems within and dis	acquire a basic understanding of acoustics, measurement and diagnosis of auditory functions, including technical principles, instrumentation and sol	ftware, and hearing a	aids and
Carried ourse, which, according to Ad 90/2004 Colin, allows for advanced and avalation of and avalation avalation and avalation and avalation and avalation avalation and avalation and avalation avalation and avalation and avalation and avalation and avalation avalation and avalation avalatresis avalatresis avalation avalation avalation avalation avalati	replacements. The students will be able to orient themselves. They will be able to learn about these issues, learn about other areas of medical instrum	the framework of the	as used in
relation like after obtaining the so-called professional competence Blorendizal technician under the Act.           F7PBBTEL         Theory of Electrical Engineering         Z,ZK         4           Electric current. Distribution of electric al 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 in the conductivity, creation of the semiconductor crossing, properties in the forward and reverse direction. Bipolar transistor- transistor finciple in elementary circuit. Unipolar transistor: Unipolar transistors with complementary volvosti (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.         Z,ZK         4           CT systems (basic principle, schematic arrangement system, basic physical principle, developmental generations, basic principles of reconstruction). Imaging systems magnetic reconding and specially laboratory exercises provide students with an insight into the principles of recanning, digitzed and specially laboratory exercises provide 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.           F7PBBULS         Introduction to Signals and Systems.         Z,ZK         4           Inviction and properties of scanning image means in context, which	certified course which according to Act 96/2004 Coll allows for the acquisition of the so-called "certificate of audiology". Special professional compete	ence Technical audic	logist after
F7PBBTEL         Theory of Electrical Engineering         Z,ZK         4           Electric current, DC and AC currents. Electrical curcuits including R, L, C. Power of electric current, DC and AC current to and electrical appliance, impedance of the source, mutual loading of the source and electrical appliance, impedance of the source, mutual loading of the source and electrical appliance, impedance of the source, mutual loading of the source and electrical appliance, impedance of the source mutual loading of the source and electrical sourcent is semiconductor, type of the conductivity, creation of the semiconductor crossing, properties in the forward and reverse direction. Biolar transistor - fieldet, basic principle in elementary circuit. Unipolar transistors with complementary volvoits (CMOS). Electromagnetic edets (induction, magnetization, force effect). Electromagnetic every separadin, interference, electromagnetic weak, principles of reconstruction of signals. Electromotors principles.           F7PBBTZS         Tomographical Imaging Systems         Z,ZK         4           C1 systems (basic principle, specialized imaging assets (hybride). Ultrasound imaging systems. Doppler systems. Subject and especially laboratory exercises provide students with an inspirit not the principles of scanning image mases in context, which is important especially in terms of interdisciplinarity of the subject and the field as a whole.           F7PBBUSS         Introduction to Signals and Systems         Z,ZK         4           F7PBBUSS         Introduction to Signals and Systems.         Z,ZK         4           F7PBBUSS         Introduction to Signals and Systems.         Z,ZK         4	araduation, i.e. after obtaining the so-called professional competence Biomedical technician under the Act.		logist arter
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. Con-ection of the electrical systems. Input resistance and impedance of the source, mutual loading of the source and electrical appliance, impedance matching. Properties of circuits in time and frequency obnaricateristics of the LC 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 transistors with complementary vodivosti (CMOS). Electromagnetic effects (induction, magnetization, force effect). Electromagnetic wave, spreading, interference, electromagnetic compatbility. Soft and hard magnetic materials. Transformers construction and parameters. Magnetic recording and reproduction of signals. Electromotors principles. Setters hybridal transitors systems (hybridal). Ultrascound imaging systems: Subject and bespically bespically eventories pervised 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. F7PBBZIS Introduction to Signals. Electromotors principle. Settemating systems: Nobregin and description. Emphasis is placed on the external and internal diverse is to acquaint students with the basics of signal processing, especially with time and frequency domain operations. Emphasis is placed on the external and internal diverse is to acquaint students with the basics of legislation in Health Care and Technical Standards is to teach students with sequal devices, bourting but helpsitative requiration and and properties and corequiraters and regulatory obligat	F7PBBTFL Theory of Electrical Engineering		
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 inclusion and parameters. Magnetic recording and reproduction of signals. Electromagnetic compatibility. Soft and hard magnetic materials. Transformers construction and parameters. Magnetic recording and reproduction of signals. Electromotors: principles.         F7PBBTZS       Tomographical Imaging Systems       Z,ZK       4         CT systems (basic 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, digitzation 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.       F7PBBUSS         F7PBBUSS       Introduction to Signals and Systems       Z,ZK       4         Atms / atms: The aim of the course Legislation in Health Care and Technical Standards       KZ       2         Atms / atms: The aim of the course Legislation in Health Care and Technical Standards       KZ       2         Atms / atms: The aim of the course Legislation in Health Care and Technical Standards is to teach		77K	4
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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 of 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.  F7PBBUSS Introduction to Signals and Systems F7PBBUS Introduction to Signals neglecially alternations. Emphasis is placed on a thorough understanding of Fourier analysis. The second part of the course is focused on acquainting students with systems, their properties and description. Emphasis is placed on the external and internal description of linear dynamical systems.  F7PBBZLN Legislation in Health Care and Technical Standards KZ 2 Aims / aims: The aim of the course Legislation relating to health care issues. Furthermore, students will be abaic originates with the basics of legislation process, as well as regulation related to the medical devices, los with legislative regulators in the field of medical devices. During the course, students will learn the basics of medical students with the rights and obligations arising from current legislation relating to health care issues. The emphasis is not on mornizing of the text of legislation in the auth	Electric current, DC and AC currents. Electrical curcuits including R, L, C. Power of electric current, thermal effect of electric current. Distribution of elec electrical systems. Input resistance and impedance, idle voltage, inner resistance and impedance of the source, mutual loading of the source and electrical systems.	Z,ZK   trical energy. Conne- ectrical appliance, im	4 ction of the pedance
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the issue of digitization and basic methods of image data analysis.         F7PBBZP       Basics of Pathology       ZK       2	Electric current, DC and AC currents. Electrical curcuits including R, L, C. Power of electric current, thermal effect of electric current. Distribution of electerical systems. Input resistance and impedance, idle voltage, inner resistance and impedance of the source, mutual loading of the source and dee matching. Properties of circuits in time and frequency domain. Transient action in DC circuits, frequency characteristics of the L/C circuit. Electrical current, UN circuits, transistor - transistor effect, basic principle transistor. Unipolar transistors with complementary volvosti (CMOS). Electromagnetic effects (induction, magnetization, force effect). Electromagnetic electromagnetic compatibility. Soft and hard magnetic materials. Transformers construction and parameters. Magnetic recording and reproduction of signary states (basic principle, schematic arrangement system, basic principle, developmental generations, basic principles of reconstruction) resonance. PET and SPECT principle. Specialized imaging systems (hybride). Ultrasound imaging systems. Doppler systems. Subject and especially students with an insight into the principle of creating image data used in medicine, the principle of methods their scanning, digitization and subsequent function and properties of scanning image means in context, which is important especially in terms of interdisciplinarity of the subject and the former analysis. The second part of the course is focused on acquaining students with systems, their properties and description. Emphasis is place of Fourier analysis. The second part of the course is focused on acquaining students will systems. Subject and regulatory oblig in the field of medical devices. During the active course, students will learn the basics of legislation process, as well as regulation related to the medical devices in the field of medical devices. During the course, students will learn the basics of medical devices and reporties of medical devices such should have a comprehensitic and Electrical such and	Z,ZK         trical energy. Connectorical appliance, immerent in semiconducte         e in elementary circul wave, spreading, intignals. Electromotors         Z,ZK         aboratory exercises         t processing, on the field as a whole.         Z,ZK         aboratory exercises         t processing, on the field as a whole.         Z,ZK         ed on a thorough unce         ed on the external ar         KZ         isticts in healthcare,         s, Iso with legislative is to acquaint students         ut on acquainting students         ut on acquainting students         in this area. Output kir         e to orientate himsel         health care.         KZ	4 ction of the pedance or, type of iit. Unipolar terference, principles. 4 nagnetic s provide principle of 4 lerstanding nd internal 2 especially regulations s with the udents with sites: To nowledge, f in a given 2
F7PBBZPBasics of PathologyZK2	Electric current, DC and AC currents. Electrical curcuits including R, L, C. Power of electric current, thermal effect of electric current. Distribution of electrical systems. Input resistance and impedance, idle voltage, inner resistance and impedance of the source, mutual loading of the source and elematching. Properties of circuits in time and frequency domain. Transient action in DC circuits, frequency characteristics of the L/C circuit. Electrical cur the conductivity, creation of the semiconductor crossing, properties in the forward and reverse direction. Bipolar transistor - transistor effect, basic principle transistors with complementary vodivosti (CMOS). Electromagnetic effects (induction, magnetization, force effect). Electromagnetic electromagnetic compatibility. Soft and hard magnetic materials. Transformers construction and parameters. Magnetic recording and reproduction of signaprices (basic principle, schematic arrangement system, basic physical principle, developmental generations, basic principles of reconstruction) resonance. PET and SPECT principle. Specialized imaging systems (hybride). Ultrasound imaging systems. Doppler systems. Subject and especially students with an insight into the principles of creating image data used in medicine, the principle of methods their scanning, digitization and subsequent function and properties of scanning image means in context, which is important especially in terms of interdisciplinarity of the subject and the foreure analysis. The second part of the course is focused on acquainting students with systems, their properties and description. Emphasis is place description of linear dynamical systems. Compared and 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 in the field of clinical trials and the operation of medical devices. Furthermore, students will learn the basic requirements and regulatory oblig in the field of clinical trials and the operat	Z,ZK         trical energy. Connectorical appliance, immerent in semiconducte         e in elementary circul         wave, spreading, inignals. Electromotors         Z,ZK         b. Imaging systems in         laboratory exercises         t processing, on the         he field as a whole.         Z,ZK         ed on a thorough unce         ed on the external ar         KZ         jations in healthcare,         s, Iso with legislative         to acquaint students         ut on acquainting stu         n this area. Output kr         e to orientate himsel         health care.         KZ         ization). This goal als	4 ction of the pedance or, type of it. Unipolar terference, principles. 4 nagnetic s provide principle of 4 lerstanding nd internal 2 especially regulations s with the udents with sites: To nowledge, f in a given 2 so includes
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