Study plan

Name of study plan: Biomedical Informatics - full-time study

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Biomedical and Clinical 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: 162

The role of the block: Z

Code of the group: 17PBI POV

Name of the group: Biomedical Informatics compulsory course 13

Requirement credits in the group: In this group you have to gain 162 credits

Requirement courses in the group: In this group you have to complete 44 courses

Credits in the group: 162

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
17PBIALP	Algoritmic and Programming Theory	Z,ZK	5	2P+2C	Z	Z
17PBIJA3	English III.	KZ	4	4C	Z	Z
17PBIBP	Bachelor Thesis Zoltán Szabó, Ond ej Klempí Zoltán Szabó Zoltán Szabó (Gar.)	Z	8	8L	L	Z
17BOZP	Occupational Safety and Health, Fire Protection and First Aid Petr Kudrna Petr Kudrna (Gar.)	Z	0	1P	Z	Z
17PBIBPD	Safety of Data Transmission and Processing	Z,ZK	2	2P+1C	Z	Z
17PBIBIF	Bioinformatics Ond ej Klempí	KZ	4	2P+1C	Z	Z
17PBIBS	Biomedical Statistics	Z,ZK	5	2P+2C	L	Z
17PBIDDS	Data and Data Structures	Z,ZK	5	2P+2L	L	Z
17PBIDBS	Database Systems	Z,ZK	3	1P+1C	Z	Z
17PBIDTA	Desktop Application of MS Office Zoltán Szabó	KZ	3	1P+1C	Z	Z
17PBIEHT	eHealth and Telemedicine	Z,ZK	5	2P+2C	L	Z
17PBIEUI	Expert Systems and Artificial Intelligence for Medicine	Z,ZK	3	2P+1C	Z	Z
17PBIIPZ	Implementation and Support of IS in Health Care	Z,ZK	3	1P+1C	Z	Z
17PBIIT	Information Technologies	Z,ZK	3	2P	Z	Z
17PBIITP	Integral Calculus	Z,ZK	5	2P+2C	L	Z
17PBILDT	Laboratory Diagnostics and Technology	Z,ZK	4	1P+1L	L	Z
17PBILTR	Medical Terminology	Z	1	1P	Z	Z
17PBILAD	Linear Algebra and Differential Calculus	Z,ZK	5	2P+2C	Z	Z
17PBILOG	Logics	Z,ZK	4	2P+2L	Z	Z
17PBIMTL	Matlab	KZ	3	2C	L	Z
17PBIVZP	Methods of Healthcare Reporting	KZ	2	1P	L	Z
17PBIMS	Modelling & Simulation	Z,ZK	5	2P+2C	L	Z
17PBINIS	Hospital Information Systems	Z,ZK	5	2P+2C	Z	Z

17PBIPJC	C++ and C# Programming	Z,ZK	3	1P+2C	Z	Z
17PBIOPS	Operating Systems	KZ	3	2P	L	Z
17PBIDPS	Computer Network	Z,ZK	5	2P+2C	L	Z
17PBIPPZ	Programming Tools	KZ	3	2L	Z	Z
17PBIPAB	Computer Security and Legal Aspects of IT	KZ	4	1P+1C	L	Z
17PBIRBL	Robotics in Medicine	KZ	2	1P+1L	L	Z
17PBISPR	Term Project Zoltán Szabó	KZ	5	48	Z	Z
17PBITZT	Theory and Practice of Journalistic Writing	Z,ZK	5	2P+2C	L	Z
17PBITWA	Web Application Development	KZ	3	2C	L	Z
17PBITPR	Team Project	KZ	6	48	L	Z
17PBIUSS	Introduction to Systems and Signals	Z,ZK	5	2P+2C	Z	Z
17PBIVAA	Multi-tier Application Architecture in Biomedicine	KZ	3	1P+2S	Z	Z
17PBIKO1	Principles of Clinical Branches I	Z,ZK	3	2P	Z	Z
17PBIKO2	Principles of Clinical Branches II	Z,ZK	2	2P	L	Z
17PBIPM1	Fundamentals of Preclinical Medicine I	Z,ZK	3	2P	Z	Z
17PBIPM2	Fundamentals of Preclinical Medicine II	Z,ZK	3	2P	L	Z
17PBITM1	Fundamentals of Theoretical Medicine I	Z,ZK	3	2P	Z	Z
17PBITM2	Fundamentals of Theoretical Medicine II	Z,ZK	3	2P	L	Z
17PBIZEL	The Basic Use of E-learning	Z,ZK	3	1P+1C	Z	Z
17PBIZIZ	Information Sources in Health Care	Z,ZK	3	1P+1C	L	Z
17PBIZOD	Image Data Processing Zoltán Szabó	Z,ZK	5	2P+2L	Z	Z

haracteristics o	f the courses of this group of Study Plan: Code=17PBI POV Name=Biomedical Informatics	compulsory of	ourse 13
17PBIALP	Algoritmic and Programming Theory	Z,ZK	5
Algorithm, data structu	es. Identifiers, data types. assignment statement, conditional statement, cycles. Arithmetical and logical operations. Digital repr	esentation of numb	ers, numeration
systems. Introduction t	o structured programming in C language - building and structure of simple programs, creating of the user functions, user inpu	it and output, file m	anagement,
nemory management.	Practical overview of programming techniques and basic algorithms in C language. Recursive and iterative methods, measuri	ng algorithm quality	y. Abstract data-
ypes, data sorting and	searching, implementation of basic numerical algorithms. Introduction to biomedical data processing - programmers view. In	troduction to softwa	are engineering.
17PBIJA3	English III.	KZ	4
The aim of the subject	is to extend the wordstock of students in the field of biomedical engineering and its terminology. The subject is primarily focu	sed on the develop	ment of
communicative and sp	eaking skills.		
17PBIBP	Bachelor Thesis	Z	8
ndividual student proje	cts at the end of bachelor studies. Topics are selected during the 5th term from a list. Bachelor thesis is defended at the end of	of the examination p	eriod. Bachelor
hesis defence is a par	of the state exam. Bachelor thesis can be written and defended either Czech or English. Students are supervised by a tutor du	ring the above mer	itioned process.
17BOZP	Occupational Safety and Health, Fire Protection and First Aid	Z	0
7PBIBPD	Safety of Data Transmission and Processing	Z,ZK	2
he orientation of this of	ourse is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. I	Soth symmetrical ar	nd asymmetrical
ryptographic systems	are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis.		
7PBIBIF	Bioinformatics	KZ	4
aboratories around th	e world produce massive amount of new nucleotide and protein sequences, gene expression profiles, 3-D structures and oth	er data of biologica	al character. To
lustrate this fact, the r	umber of known nucleotide sequences grew 100 times in just over five years. The database of 3-D structures expanded by 2	0 % in the same ye	ar and more
han 3000 organisms h	ave been or are sequenced at the moment. With an ever-increasing amount of data available, grows even the significance of	bioinformatics. Bio	informatics
	nost importantly analyses and attempt to find a meaning and useful information in this explosively growing sea of data. Bioinform		
	medical research and basic knowledge of bioinformatics methods becomes quickly indispensable for anyone with a serious int	•	
	is to introduce students with basic, but also modern promising bioinformatics methods. These methods will be shown and ex		
•	. These "hands-on" practicals are designed to show how to take an advantage of bioinformatics in every day life in a laborato		
•	sfully on students of the Uppsala University, Sweden. This course is suitable for the second- or higher year students of biology of	•	ant to specialize
	eld of research. A basic knowledge of structure of biomacromolecules (nucleic acids, proteins) is an advantage ut it is not rec	 	
7PBIBS	Biomedical Statistics	Z,ZK	5
•	oility theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, i	their distributions, o	haracteristics,
ansformations. Popul	ation and sample. Parameter estimators. Statistical tests.		
7PBIDDS	Data and Data Structures	Z,ZK	5
survey of basic data	structures and their application. A specification of abstract data types (ADT). Specification and implementation of ADT: list, s	tack, queue, set, ar	ray, look-up
able, graph, binary tre	e. Dynamic data structures and operations with them (effective searching, sorting, storing of data structures etc.). Representation	on of the data struct	tures, strategies
or choice of proper da	ta structure.		
17PBIDBS	Database Systems	Z,ZK	3
atabase function prin	ciples, methodology of relational data model design and object data model. Database systems implementation using of SQLs	92 and script langu	age PHP inside
	SQL. Database systems implementation using of SQL92 and script language VB inside postrelational database CACHE. Trans	•	•
f client-server and dis	tributed database systems. Both principles relational and postreational will practice and show. Database CACHE includes bo	th principles. It is d	atabase service
NUO			

for NIS.

17PBIDTA Desktop Application of MS Office MS Outlook - operating, use as 'Personal Information Manager' and use as email client, set up and management of accounts, Exchange server client, working with language 'Microsoft Visual Basic for Application (VBA)', COM model; MS Word - basic of typography, advanced format using styles, basic DTP, wholesale correspondence, creating XML documents, XSLT - Extensible Stylesheet Language Transformations, multi users document edit, macros creating; MS Excel - cell and sheet format, working with functions and equations, data analysis, macros creating and interactive aplications; MS Access - relation database and database in MS Access, creating new database and tables, data searching and sorting, relations between tables, using 'Data Access Pages (DAP)', database security; MS Project - Project establishing, tasks, resources, duration monitoring, task revision, project server; MS PowerPoint making presentations, working with the text and objects, graphics and multimedia, automatic, interactive and web presentations, makros; MS FrontPage, MS Publisher, MS Visios familiarizing with functionality and effective usage; mutual integration of applications MS Office package 17PBIEHT eHealth and Telemedicine Z.ZK 5 Tele-medical applications - WHO definition, history of telemedicine, relations to development of ICT. Health care organization. Communication in health care. Electronic health record as a basis for telemedicine, hospital information systems, legal issues. Information technology as support of shared and distributed health care. Data security and standardization in health care. Image information processing. Networks and Internet in health care. 17PBIEUI Expert Systems and Artificial Intelligence for Medicine Z.ZK 3 The course is aimed at providing theoretically deeper knowledge in the area of Expert systems and artificial intelligence in medicine. 17PBIIPZ Implementation and Support of IS in Health Care Z.ZK 3 Course presents basic information about specific processes of implementation and support of large Information Systems in health care area. Implementation of health care IS process is based on large project management theory description, implementation methodology standards and their application. The best practice and experience in area of large Information System implementation are documented as well. The description of the implementation process starts by decomposition of the Information System to specific modules and its implementation requirements. Implementation team structure and roles of implementation team members are discussed and described as well as time table of the implementation process including necessary documents contented and structure. Logical part of the course is costs calculation, implementation process planning methodology and risks description and management. The second part of the course is oriented on the large Information System and its users support. The course presents the typical Support contract structure, specification of vendor and customer duties and rights, classification of user's requirements, response procedures and time of vendor's call center and product specialists. Students will be informed about internal processes of required services handling on customer and support services vendor side. Z,ZK 3 17PBIIT Information Technologies Computer history, structure of computers, motherboard, processors, memody, graphical card, computer buses, BIOS, I/O devices, server, desktop, notebook, pocket PC, data storage, mobile devices, memory card, OS, tasks and memory management, printers scanner, multimedial devices, mass data storage, multitasking, multiprocessoring, set of instruction, assembler, programming languages, power test, network, LAN, WAN, interner, TCP/IP, HTTP, FTP etc., client-server, gate, router, using IT in medicine and telemedicine. 17PBIITP Integral Calculus Z,ZK 5 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 and definite integrals, improper integral, solving differential equations (ODEs) (1st order ODEs with separable variables, linear 1st order homogenous as well as non-homogenous ODEs, 2nd order linear homogenous and non-homogenous ODEs with constant coefficients), intro to multiple integrals, particularly double integral and applications. Integral transforms: Laplace transform and inverse Laplace transform and their application for solving nth order linear ODEs with constant coefficients. 17PBILDT Laboratory Diagnostics and Technology Z,ZK 4 Laboratory Diagnostics and Technology introduces the principles of bioanalytical methods used in clinical diagnostics. Emphasis is put on the data types produced by these methods as well on the tools for their analysis. During the tutorials students will be introduced into the basic principles of computer data managing and processing Medical Terminology Attendants are made acquainted with particular terms flowing from latin but also greek expressions during their lectures. Students are continuously informed about terms of whole diagnosis and therapeutical procedures. Education is combined with continuous knowlegde check up through the use of tests. 17PBILAD Linear Algebra and Differential Calculus Z,ZK The course is an introduction into linear algebra and calculus of one variable. Linear algebra part consists of: systems of linear equations and their solutions, Gauss elimination, matrices, rank of a matrix, operations with matrices, inverse matrix, determinant and its calculation, eigenvalues and eigenvectors of matrices. Differential calculus consists of: sequences and their limits. Functions of one real variable, their limits, continuousness, derivatives. Local and absolute extremes of a function of one variable, investigations of functions. Taylor-polynome. 17PBILOG Logics Z.ZK Logic system, logic circuit, logic function. Bool's algebra. Representation (models) of logic functions: expression/formula, table, cube, map, logical and functional schema, graph. Combinatorial and sequential logic nets. Huffman's schema. Minimization of expressions for combinatorial logical nets with one and more outputs. Normalized expressions, disjunctive and conjunctive forms. Minimization based on operations of Bool's algebra in expressions, in a unit cube, in a truth table (Quin-McCluskey's method), in a logic map - Karnaugh's maps. Combinatorial logical terms, circuits and blocks. Synthesis of combinatorial logic circuits NOT, AND, OR, NAND, NOR. Synthesis of combinatorial logic circuits with limited number of inputs. Modeling of sequential behavior. Finite automata: Mealy and Moore automata. Memory circuits. Analysis and synthesis of synchronized sequential nets. Asynchronous sequential logic nets. Predicate logic (PL): language, terms, formula, substitution and basic syntactic terms, semantics: structures for predicate logic, evaluation, evaluation of terms and formulas. Axiomatic system of PL: axioms, inference rules, concept of a proof, reasoning theorem. ΚZ 3 17PBIMTL Matlab Basic description of MATLAB environment. Numerical formats. Variables and matrices. Complex numbers. Rounding numbers. Basic instructions. Matrices operations. Visualization. Simulink (basic description, exercise formulation, parameters entry). Conditional and cyclical instructions. Script creation, functions, debugging. Continuous and discrete processes. Symbolical solutions. Graphical user interface creation. Applications in MATLAB. 17PBIVZP Methods of Healthcare Reporting ΚZ 2 Get familiar with basic principles of a general system for health care coverage. System of health care coverage in the Czech Republic. Legislation on health care coverage in the Czech Republic. Means of regulation of health care coverage. Methods for health care reporting. IT systems supporting health care reporting. Performance coverage, lump-sum payments, capitalization payments, payments for diagnosis. Cost record and coverage of especially high-priced items. Prescription of pharmaceuticals and medical devices, and their coverage. Means of data transfer to health insurance companies. Auditing health care coverage; inspectors in health insurance companies. Health insurance companies in the Czech Republic. System of regressive refunds. Health documentation. Z.ZK 5

17PBIMS Modelling & Simulation

Modelling and simulation - fundamentals. Compartmental models. Models of population dynamics - single species population, interacting population, continuous models, discrete models. Models with age distribution. Epidemic models - model of SIR structure, criss-cross models, models of venereal diseases.

17PBINIS	Hospital Information Systems	Z,ZK	5
	sodes, organization and workflow of hospital care. Data items and structuring electronic patient record. The structure of patient		- 1
	pleteness. Record of medical information and data, display and prints of medical records and information. Patient admission,		•
	nic medical record forms. Medical order and record of drug and infusion therapy. Electronic patient record, registration physiol	_	-
	the quality of care, standardization and accreditation of providers of hospital care. Protocols of patient care. Orders, findings a onitoring. Structured patient record and its interpretation. Intensive care and resuscitation. Resuscitation record. Calculation		
	omorning. Structured patient record and its interpretation, intensive care and resuscitation, Resuscitation record. Calculation is ssification of severity of patient condition. Surgical care, surgery planning, traffic management of operating rooms. Anesthesic	. , .	
	patient episode, outpatient patient record and outpatient information subsystems. Laboratory information systems, LIS databa		•
	e laboratory complement. Radiology IS, specific workflow, planning, testing, generation, transmission and archiving of digital		
_	ulti-dimensional medical data coding systems (ICD-10, SNOP, SNOMED,). Data standards for transmission and storage of	-	
	ting of health care, performance-related systems, DRG, controlling of clinical departments.		,
17PBIPJC	C++ and C# Programming	Z.ZK	3
	nming. Variables, strings. Classes (methods, parameters, constructors, polymorphism, virtual methods, inheritance). Arrays. G	1 ' 1	-
	iry. Errors and exceptions. Input-output operations. Files, streams - read, write. XML. Databases and Entity Framework.	,	-,
17PBIOPS	Operating Systems	KZ	3
17PBIDPS	Computer Network	Z,ZK	5
	techniques required for safe and efficient communication in networks bases on telecommunication, local area and wireless te		
	of their usage in distributed applications and distributed algorithms are presented in several lectures. The aim of exercises is	=	
_	with frequently utilized programming techniques.	o to try como or m	0011011101110 0110
17PBIPPZ	Programming Tools	KZ	3
	software resources in MS Windows and GNU/Linux environment - office applications, basic visualisation of experimental data		-
	rmats, compatibility. Selected parts of the course are compatible with the ECDL (European Computer Driving Licence) knowle		,
17PBIPAB	Computer Security and Legal Aspects of IT	KZ	4
	d e health are discussed.	112	7
17PBIRBL	Robotics in Medicine	KZ	2
	medicine and laboratory technics what kind of task is solving, synthesis of kinematics according to the task processed by rot		
	nematics a dynamics of robot arm - computing methodology, verification of obtained models in Matlab environment, sensors an		
	bot control paradigms - according human (operator) task.	ia anvoc acca by i	oboto applicable
17PBISPR	Term Project	KZ	5
_	nd presentation skills. Creation of presentations and written texts. Typography rules. Types, purpose and requirements of tech		-
	ted bibliographic search.	modi procentation	io and toomina
17PBITZT	Theory and Practice of Journalistic Writing	Z,ZK	5
	earn about theory and practice of journalism. Students will be introduced into problematic of mass communication, types of r	, ,	-
	sam about moonly and produce on journalism stademe min be introduced into problematic or made communication, types on	inoana ama mion op	, , , , , , , , , , , , , , , , , , , ,
basics of journalism and	internet as instrument of communication.		
	I internet as instrument of communication. Web Application Development	K7	3
17PBITWA	Web Application Development	KZ anguages, databa	3 se systems, web
17PBITWA Client-server communic	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing la	anguages, databa	se systems, web
17PBITWA Client-server communic	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing lation web application development, developing tools, design web application and realization, web hypermedial systems, e-location and realization.	anguages, databa	se systems, web
17PBITWA Client-server communic	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing la hes in web application development, developing tools, design web application and realization, web hypermedial systems, e-leweb systems.	anguages, databa	se systems, web
17PBITWA Client-server communic server, modern approac of medical informational 17PBITPR	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing lation web application development, developing tools, design web application and realization, web hypermedial systems, e-location and realization.	anguages, databas learning systems	se systems, web on web, design
17PBITWA Client-server communic server, modern approac of medical informational 17PBITPR Basic communication ar	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing la hes in web application development, developing tools, design web application and realization, web hypermedial systems, e-le web systems. Team Project	anguages, databas learning systems	se systems, web on web, design
17PBITWA Client-server communic server, modern approac of medical informational 17PBITPR Basic communication ar purpose and requiremen	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing lathes in web application development, developing tools, design web application and realization, web hypermedial systems, elweb systems. Team Project Indepresentation skills, including team work, team heading and project management. Creation of presentations and written textents of technical presentations and technical texts. Writing a commented bibliographic search.	nguages, databas learning systems KZ kts. Typography ru	se systems, web on web, design
17PBITWA Client-server communic server, modern approac of medical informational 17PBITPR Basic communication ar purpose and requirement 17PBIUSS	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing lathes in web application development, developing tools, design web application and realization, web hypermedial systems, e-leweb systems. Team Project Indepresentation skills, including team work, team heading and project management. Creation of presentations and written texters.	nguages, databa learning systems KZ kts. Typography ru Z,ZK	se systems, web on web, design 6 les. Types,
17PBITWA Client-server communic server, modern approac of medical informational 17PBITPR Basic communication ar purpose and requirement 17PBIUSS To introduce students to	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing lathes in web application development, developing tools, design web application and realization, web hypermedial systems, eleweb systems. Team Project and presentation skills, including team work, team heading and project management. Creation of presentations and written textents of technical presentations and technical texts. Writing a commented bibliographic search. Introduction to Systems and Signals	nguages, databa learning systems KZ kts. Typography ru Z,ZK	se systems, web on web, design 6 les. Types,
17PBITWA Client-server communic server, modern approac of medical informational 17PBITPR Basic communication ar purpose and requirement 17PBIUSS To introduce students to relations in computer lat	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing lathes in web application development, developing tools, design web application and realization, web hypermedial systems, eleweb systems. Team Project add presentation skills, including team work, team heading and project management. Creation of presentations and written text of technical presentations and technical texts. Writing a commented bibliographic search. Introduction to Systems and Signals basics of theory of signals and systems. To explain main principles on applications from biology and medicine. To become apporatories by means of MATLAB.	nguages, databa learning systems KZ kts. Typography ru Z,ZK cquainted with ba	se systems, web on web, design 6 les. Types, 5 sic mutual
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17PBITWA Client-server communic server, modern approac of medical informational 17PBITPR Basic communication ar purpose and requirement 17PBIUSS To introduce students to relations in computer lat 17PBIVAA Students will get acquai	Web Application Development ation and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing lathes in web application development, developing tools, design web application and realization, web hypermedial systems, eleveb systems. Team Project and presentation skills, including team work, team heading and project management. Creation of presentations and written textents of technical presentations and technical texts. Writing a commented bibliographic search. Introduction to Systems and Signals basics of theory of signals and systems. To explain main principles on applications from biology and medicine. To become an orientaries by means of MATLAB. Multi-tier Application Architecture in Biomedicine inted with the design and usage of the client-server software architecture namely in biomedicine applications. Principles of Clinical Branches I	nguages, databade learning systems of KZ Kts. Typography ru Z,ZK acquainted with bat KZ Z,ZK	se systems, web on web, design 6 les. Types, 5 sic mutual 3
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17PBIZIZ Information Sources in Health Care

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Bibliographic resources: primary information resources, structure of the professional communication, secondary information resources, bibliographic databases. Medical databases and registries: image and pharmacological databases, national medical registries - purpose, legislation, data entry, accessibility of outputs, forms of data mining. Internet resources: types of the Internet resources in health care, Internet search services, strategy and tactics of the Internet search. Evaluated information resources: Evidence Based Medicine, The Cochrane collaboration, EBM databases, interpretation of meta-analysis, recommended guidelines. Quality of bibliographic information: Impact factor, SCI database, the accuracy, completeness and effectiveness of information search in databases Quality of Internet information: visit rate, citation, criteria for quality web presentations, international evaluation standards. Information resources for the public: credibility evaluation of resources, sociological aspects of information optimality, interactive resources of communication

17PBIZOD Image Data Processing

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Continuous image representation, linear 2D systems, 2D spectrum, Digital representation of images, Basic image characteristics: brightness, contrast, resolution, noise, look up tables, histogram, Discrete Fourier transform, discrete cosine transform, image enhancement, geometric operations, image filtering, morphological operations, image restoration, image segmentation, basic principles of image compression.

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 18

The role of the block: S

Code of the group: 17PBI PV 1S

Name of the group: Biomedical Informatics compulsory optional course 1st semester 13 Requirement credits in the group: In this group you have to gain at least 3 credits (at most 6)

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

Credits in the group: 3 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
17PBIFY1	Physics I.	KZ	3	2P	Z	S
17PBISM	Mathematical Seminars	KZ	3	2S	Z	S

Characteristics of the courses of this group of Study Plan: Code=17PBI PV 1S Name=Biomedical Informatics compulsory optional course 1st semester 13

17PBIFY1	Physics I.	KZ	3				
Physics I course will all	Physics I course will allow students to acquire and strengthen knowledge in these branches of physics: mechanics, thermodynamics and solid state physics. Through the course we						
also touch the limits of	also touch the limits of the classical Physics.						
17PBISM	Mathematical Seminars	KZ	3				

Code of the group: 17PBI PV 2S

Name of the group: Biomedical Informatics compulsory optional course 2nd semester 13

Requirement credits in the group: In this group you have to gain at least 3 credits (at most 12)

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

Credits in the group: 3 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
17PBIAZI	Applied Informatics in Health Care	KZ	3	1P+1C	L	S
17PBIFY2	Physics II.	KZ	3	2P	L	S
17PBIMVP	Research Methodology	KZ	3	1P+1C	L	S
17PBINMP	Project Proposal and Management	KZ	3	1P+1C	L	S

Characteristics of the courses of this group of Study Plan: Code=17PBI PV 2S Name=Biomedical Informatics compulsory optional course 2nd semester 13

17PBIAZI	Applied Informatics in Health Care	KZ	3			
The subject contains th	The subject contains the basic areas of medicine, which are presented on the internet by the medium of medical-related web pages. Information sharing					
forums and electronic of	onferences for fields like pharmacy or stomatology is also discussed.					
17PBIFY2	Physics II.	KZ	3			
The Physics II course in	troduces fundamentals and applications of electromagnetic fields. The covered topics include electromagnetic interaction, el	ectric field, magn	etic field,			
electromagnetic field, M	laxwell's equations, electromagnetic radiation, fundamentals of quantum physics, atomic nucleus and elementary particles, a	and interaction of	adiation with			
matter.						
17PBIMVP	Research Methodology	KZ	3			

Methodical starting points of research. Methods and technology of research. Logic of scientific research. Theoretical starting points of research. Scientific information as a fool for everyday work. Structure of scientific information, possibility for their acquisition, methods of processing and application in practice. Description of principles for searching for scientific information. Description of specific systems, namely from health service. Final report.

17PBINMP Project Proposal and Management

ΚZ

3

How to apply for a grant project. Types of grant projects. Stages of proposal of the project. Specific requierements of projects. Documentation of the projects. Management, ordering and coordination of the project. Curriculum vitae. Planing and controlling of project realization. Presentation of the project. Team management in project. Sample application.

Code of the group: 17PBI PV 3S

Name of the group: Biomedical Informatics compulsory optional course 3rd semester 13

Requirement credits in the group: In this group you have to gain at least 3 credits (at most 9)

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

Credits in the group: 3 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
17PBILOD	Medical and Nursing Documentation	KZ	3	2P	Z	S
17PBIMZB	Biosignal Measuring & Processing in Real Time	KZ	3	1P+1L	Z	S
17PBITEL	Theory of Electrical Engineering	KZ	3	2P	Z	S

Characteristics of the courses of this group of Study Plan: Code=17PBI PV 3S Name=Biomedical Informatics compulsory optional course 3rd semester 13

17PBILOD Medical and Nursing Documentation

〈Z

3

The course are focused on basic principles and concepts of medical and nursing documentation. The topic for this course is the main structure of the ambulatory check-ups, the structure of the records of patient hospitalization, the emphasis will be given to the specific clinical departements, such as oncology, internal medicine, traumatology, surgery etc. The seminar also provides an introduction to main code classification systems (scores) specific to individual disciplines - TNM, FIGO, Child - Pugh, Karnofsky, Ishak, etc. In the last lessons the students learn the fundamentals of nursing documentation and the basic standards of nursing care.

17PBIMZB Biosignal Measuring & Processing in Real Time

ΚZ

3

Real-time, latency, interrupts. Design of the measuring chain - input circuits, bus structure of the digital part, signal processing unit (microcontrolers, signal processors, single chip industrial computers, personal computers). Operating system Windows and real time, serious real-time operating systems. Multitasking and preemption, priority of processes, multithreading. Algorithms of real-time biosignal processing.

17PBITEL Theory of Electrical Engineering

<_

3

Electric current, DC and AC currents. Electrical curcuits including R, L, C. Power of electric current, thermal effect of electric current. Distribution of electrical energy. Connection of the electrical systems. Input resistance and impedance, idle voltage, inner resistance and impedance of the source, mutual loading of the source and electrical appliance, impedance matching. Properties of circuits in time and frequency domain. Transient action in DC circuits, frequency characteristics of the L/C circuit. Electrical current in semiconductor, type of the conductivity, creation of the semiconductor crossing, properties in the forward and reverse direction. Bipolar transistor - transistor effect, basic principle in elementary circuit. Unipolar transistor. Unipolar transistors with complementary of conductance (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.

Code of the group: 17PBI PV 4S

Name of the group: Biomedical Informatics compulsory optional course 4th semester 13

Requirement credits in the group: In this group you have to gain at least 3 credits (at most 12)

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

Credits in the group: 3

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
17PBIFY3	Physics III.	KZ	3	1P+1C	L	s
17PBIJV	Java	KZ	3	2C	L	s
17PBIPPT	Advanced Programming Techniques	KZ	3	2C	L	S
17PBIPPP	Programming Tools (Advanced)	KZ	3	2L	L	S

Characteristics of the courses of this group of Study Plan: Code=17PBI PV 4S Name=Biomedical Informatics compulsory optional course 4th semester 13

17PBIFY3	Physics III.	KZ	3				
The course extends the previous courses Physics I. and Physics II. In this set of courses the main emphasis is placed on the understanding of priciples and the ability to solve standard							
physical examples. In Physics III. course we study waves, optics and lasers. We concentrate on practical examples and experiments.							
17PBIJV	Java	KZ	3				
The subject is focused	on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of	of programming in	c #. In the				
framework of exercises	will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks	, the commands o	f a programming				
language, design meth	language, design methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exceptions, introduction to user						
interfaces, technologies for creating the presentation layer of a program.							
17PBIPPT	Advanced Programming Techniques	KZ	3				

17PBIPPP Programming Tools (Advanced) KZ 3
Introduction to software tools on MS Windows platform and GNI // inux platform Problem of portability of data-files standardized exchange formats - HTML XML PDF ODE PN

Introduction to software tools on MS Windows platform and GNU/Linux platform. Problem of portability of data-files, standardized exchange formats - HTML, XML, PDF, ODF, PNG etc. Introduction to administartion and configuration of MS Windows and GNU/Linux, programming of scripts, connectivity and comaptibility of major operating systems. Multiplatform applications - WWW browsers, e-mail clients, Office toolboxes, Graphical and CAD programs.

Code of the group: 17PBI PV 5S

Name of the group: Biomedical Informatics compulsory optional course 5th semester 13

Requirement credits in the group: In this group you have to gain at least 3 credits (at most 15)

Requirement courses in the group: In this group you have to complete at least 1 course (at most 5)

Credits in the group: 3 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
17PBIIAB	Information Analysis of Biological Systems & Signals	KZ	3	1P+1C	Z	S
17PBIITH	IT for Handicapped People	KZ	3	1P+1L	Z	S
17PBILPZ	Medical Devices & Equipment Petr Kudrna	KZ	3	2P	Z	S
17PBIMTB	Microprocessors in Medicine	KZ	3	1P+1L	Z	S
17PBIZS	Imaging Systems	KZ	3	2P	Z	S

Characteristics of the courses of this group of Study Plan: Code=17PBI PV 5S Name=Biomedical Informatics compulsory optional course 5th semester 13

17PBIIAB	Information Analysis of Biological Systems & Signals	KZ	3	
Information entropy, applications. Average mutual information. Continuous and discrete communication channel. Relationship of information and thermodynamic entropy. Principle of				
maximal entropy. Biosystem organization, models and system identification. Introduction of statistical decision making, testing of statistical hypothesis, Bayessian approach.				
17PBIITH	IT for Handicapped People	KZ	3	
17PBILPZ	Medical Devices & Equipment	KZ	3	
Medical devices catego	ries. Electrical safety of medical devices. Biopotentials amplifiers. Electrocardiographs, electromyographs and electroenceph	alographs. Dilutior	n methods of	
blood flow and cardiac	output measurement. Blood pressure measurement. Cardiac frequency measurement. Phonocardiography. Pulse oxymetry. M	edical monitors. E	lectrostimulation	
and electrosurgery med	lical devices. Therapeutic medical devices. Implantable medical devices. Telemetry. Medical devices for audiology.			
17PBIMTB	Microprocessors in Medicine	KZ	3	
Introduction to embedded microprocessor systems in medicine, principles and structure of microcontrolers, logical circuits. Interconnection with common peripheral devices: AD and				
DA converters, serial communication, WIFI, Bluetooth a GPRS communication. Examples of embedded systems on architectures 8051, AVR, PIC and ARM. Introduction to multiplatform				
software development f	o embedded systems.			
17PBIZS	Imaging Systems	KZ	3	
Electromagnetic radiation and relationship to the medical imaging systems. Imaging theory fundamentals. 2D Fourier transform and related applications. Transfer properties of imaging				
systems. Optical imaging systems. Television (TV) imaging systems (including videoendoscopy and capsule imaging). Fundamentals of image processing. Imaging systems using				
infrared radiotion (termovision systems). X-ray imaging systems. X-ray TV medical imaging systems. Nuclear medical imaging systems. Ultrasound medical imaging systems Doppler				
systems. Computed tomography (basic idea, schematic system arrangement, basic physical principle, development generation, basic principles of reconstruction) Magnetic resonance				
imaging. Positron emission tomography (PET) and Single photon emission computed tomography (SPECT) Specialized medical imaging systems. Lectures and laboratory exercises				
offer to students view on the medical image data formation, on the sensing and scanning principles, on the digitization and processing, on the functional principle and image sensing				

Code of the group: 17PBI PV 6S

Name of the group: Biomedical Informatics compulsory optional course 6th semester 13

devices as well. There are very important mutual relationships, which are important from the point of view of subject and study branch interdisciplinarity.

Requirement credits in the group: In this group you have to gain at least 3 credits (at most 12)

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

Credits in the group: 3

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
17PBIEZP	Economics of Health Services	KZ	3	1P+1S	L	S
17PBIGZS	Biosignals Genesis and Processing	KZ	3	1P+1L	L	S
17PBISRK	Quality Management Systems	KZ	3	1P+1S	L	S
17PBIZLN	Legislation in Health Care and Technical Standarts	KZ	3	1P+1S	L	S

Characteristics of the courses of this group of Study Plan: Code=17PBI PV 6S Name=Biomedical Informatics compulsory optional course 6th semester 13

17PBIEZP	Economics of Health Services	KZ	3
Introduction to Economi	cs of medical facilities, main terms. Investments in healthcare - economic balance. Investment planning and management, inter	connection betwe	en maintenance
and investments, contra	cts. Costs incurred by legislation and mere operation of the technology. Return on investments, risk analysis. Commodity know	wledge of consum	ables and spare
parts. Prices of medical	devices consumables and tools.		
17PBIGZS	Biosignals Genesis and Processing	KZ	3
The subject deals with o	rigins and description of the most important electric and non-electric biological signals. The principles of generation, recording	g and basic prope	rties are studied
in all the signals. The str	udied signals involve native and evoked biosignals, including biological signals of the heart, brain, muscles, nervous system,	auditory signals,	visual system,
signals from the gastro-i	ntestinal system etc. Advanced methods of digital biosignal processing,spectrum analysis, modern methods of artificial intellige	nce, features extra	action, automatic
classification, graphic pr	resentation of results. Adaptive segmentation, artificial neural networks for signal procesing.		
17PBISRK	Quality Management Systems	KZ	3
Quality. Quality manage	ment. Relevant norms. Quality of the hospital processes and systems. Improvement and reengineering of the processes. Eur	omodel TQM. He	alth care quality
management. Driving ar	nd of realization processes of the health care facilities, map of the processes and subprocesses. Project of the integrated man	agement of the he	alth care facility.
Possibilities of application	on of TQM within the health care facility. Relevant HW and SW.		
17PBIZLN	Legislation in Health Care and Technical Standarts	KZ	3
Public health law. Law N	lo. 96/2004 and applicable regulations.EU Directives. Legal technical product requirements. National government decrees. In	stitutional require	ments for
publication of technical	norms. Technical norms in health care. Nuclear law. Procedures concerning introduction of medical devices. Clinical testing. F	unctional position	n of the testing
rooms. Legislation conc	erning GMP, GLP and GCP.		

Code	Name of the course	Completion	Credits
17BOZP	Occupational Safety and Health, Fire Protection and First Aid	Z	0
17PBIALP	Algoritmic and Programming Theory	Z,ZK	5
	ctures. Identifiers, data types. assignment statement, conditional statement, cycles. Arithmetical and logical operations. Digital represer	,	_
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,
memory managem	ent. Practical overview of programming techniques and basic algorithms in C language. Recursive and iterative methods, measuring a	lgorithm quality. At	stract data
types, data sorting	and searching, implementation of basic numerical algorithms. Introduction to biomedical data processing - programmers view. Introdu	uction to software e	engineering
17PBIAZI	Applied Informatics in Health Care	KZ	3
The subject conta	ains the basic areas of medicine, which are presented on the internet by the medium of medical-related web pages. Information shari	ng via internet in c	discussion
	forums and electronic conferences for fields like pharmacy or stomatology is also discussed.		
17PBIBIF	Bioinformatics	KZ	4
Laboratories arour	d the world produce massive amount of new nucleotide and protein sequences, gene expression profiles, 3-D structures and other of	lata of biological cl	haracter. To
illustrate this fact,	the number of known nucleotide sequences grew 100 times in just over five years. The database of 3-D structures expanded by 20 %	% in the same year	and more
•	sms have been or are sequenced at the moment. With an ever-increasing amount of data available, grows even the significance of bi		
	nd most importantly analyses and attempt to find a meaning and useful information in this explosively growing sea of data. Bioinformatics		
	biomedical research and basic knowledge of bioinformatics methods becomes quickly indispensable for anyone with a serious interest	•	
	urse is to introduce students with basic, but also modern promising bioinformatics methods. These methods will be shown and explain		
•	ticals. These "hands-on" practicals are designed to show how to take an advantage of bioinformatics in every day life in a laboratory. The cessfully on students of the Uppsala University, Sweden. This course is suitable for the second- or higher year students of biology or ch	•	
•	biomedical field of research. A basic knowledge of structure of biomacromolecules (nucleic acids, proteins) is an advantage ut it is no	•	•
		· · · · · · · · · · · · · · · · · · ·	
17PBIBP	Bachelor Thesis rojects at the end of bachelor studies. Topics are selected during the 5th term from a list. Bachelor thesis is defended at the end of the	Z examination paris	8
-	part of the state exam. Bachelor thesis can be written and defended either Czech or English. Students are supervised by a tutor during	-	
		tile above mention	
	Sefety of Data Transmission and Drassesina	フフレ	'')
17PBIBPD	Safety of Data Transmission and Processing	Z,ZK	2 symmetrical
	is course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both	,	_
The orientation of th	is course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis.	symmetrical and a	symmetrical
The orientation of the 17PBIBS	is course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis. Biomedical Statistics	symmetrical and a	symmetrical
The orientation of the 17PBIBS	is course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis. Biomedical Statistics obability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their	symmetrical and a	symmetrical
The orientation of the 17PBIBS Introduction into programme and the second secon	is course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis. Biomedical Statistics obability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests.	symmetrical and a Z,ZK r distributions, chair	symmetrical 5 racteristics,
The orientation of the 17PBIBS Introduction into printing 17PBIDBS	is course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis. Biomedical Statistics obability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests. Database Systems	symmetrical and a Z,ZK r distributions, char	symmetrical 5 racteristics,
The orientation of the 17PBIBS Introduction into proceedings of 17PBIDBS Database function	is course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis. Biomedical Statistics obability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests.	symmetrical and a Z,ZK r distributions, chain Z,ZK and script language	5 racteristics, 3 PHP inside
The orientation of the 17PBIBS Introduction into proceed 17PBIDBS Database function relational database	bis course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis. Biomedical Statistics robability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests. Database Systems principles, methodology of relational data model design and object data model. Database systems implementation using of SQL92 and supplementation using supplementation using supplementation using supplementation using supplementation using s	symmetrical and a Z,ZK r distributions, chain Z,ZK and script language a data processing.	symmetrical 5 racteristics, 3 PHP inside Architecture
The orientation of the 17PBIBS Introduction into proceed 17PBIDBS Database function relational database	bis course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis. Biomedical Statistics obability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests. Database Systems principles, methodology of relational data model design and object data model. Database systems implementation using of SQL92 and script language VB inside postrelational database CACHE. Transition	symmetrical and a Z,ZK r distributions, chain Z,ZK and script language a data processing.	symmetrical 5 racteristics, 3 PHP inside Architecture
The orientation of the 17PBIBS Introduction into proceed 17PBIDBS Database function relational database	bis course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis. Biomedical Statistics obability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests. Database Systems principles, methodology of relational data model design and object data model. Database systems implementation using of SQL92 and script language VB inside postrelational database CACHE. Transitior distributed database systems. Both principles relational and postreational will practice and show. Database CACHE includes both principles.	symmetrical and a Z,ZK r distributions, chain Z,ZK and script language a data processing.	symmetrical 5 racteristics, 3 PHP inside Architecture
The orientation of the 17PBIBS Introduction into proceed in 17PBIDBS Database function relational database of client-server and 17PBIDDS	is course is focused to the essential mathematical theory and presents contemporary algorithms and applications of cryptography. Both cryptographic systems are mentioned. The course also contains a primer of quantum cryptography and cryptonalysis. Biomedical Statistics obability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests. Database Systems principles, methodology of relational data model design and object data model. Database systems implementation using of SQL92 and script language VB inside postrelational database CACHE. Transitior distributed database systems. Both principles relational and postreational will practice and show. Database CACHE includes both principles relational and postreational will practice and show. Database CACHE includes both principles relational and postreational will practice and show. Database CACHE includes both principles relational mathematical theory and principles relational will practice and show. Database CACHE includes both principles relational mathematical theory and principles relational mathematical statistics.	symmetrical and a Z,ZK r distributions, char Z,ZK and script language a data processing. inciples. It is datab	5 racteristics, 3 PHP inside Architecture pase service
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The orientation of the 17PBIBS Introduction into proceed in 17PBIDBS Database function relational database of client-server and 17PBIDDS A survey of basic table, graph, binary	Biomedical Statistics robability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests. Database Systems principles, methodology of relational data model design and object data model. Database systems implementation using of SQL92 and script language VB inside postrelational database CACHE. Transitior distributed database systems. Both principles relational and postreational will practice and show. Database CACHE includes both principles relations. A specification of abstract data types (ADT). Specification and implementation of ADT: list, stactive. Dynamic data structures and operations with them (effective searching, sorting, storing of data structures etc.). Representation of for choice of proper data structure.	symmetrical and a Z,ZK r distributions, chair Z,ZK and script language a data processing. inciples. It is datab Z,ZK sk, queue, set, arraithe data structure:	5 racteristics, 3 PHP inside Architecture pase service 5 ay, look-up s, strategies
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The orientation of the 17PBIBS Introduction into proceed in 17PBIDBS Database function relational database of client-server and 17PBIDDS A survey of basic table, graph, binary 17PBIDPS Lectures are oriented.	Biomedical Statistics robability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests. Database Systems principles, methodology of relational data model design and object data model. Database systems implementation using of SQL92 and script language VB inside postrelational database CACHE. Transition distributed database systems. Both principles relational and postreational will practice and show. Database CACHE includes both principles relations of abstract data types (ADT). Specification and implementation of ADT: list, stact tree. Dynamic data structures and operations with them (effective searching, sorting, storing of data structures etc.). Representation of for choice of proper data structure. Computer Network ed to techniques required for safe and efficient communication in networks bases on telecommunication, local area and wireless technicheds of their usage in distributed applications and distributed algorithms are presented in several lectures. The aim of exercises is to	symmetrical and a Z,ZK r distributions, chair Z,ZK and script language a data processing. A inciples. It is datable Z,ZK ak, queue, set, arratiche data structure: Z,ZK anologies. Structure:	5 racteristics, 3 PHP inside Architecture pase service 5 sy, look-up s, strategies 5 s of network
The orientation of the 17PBIBS Introduction into proceed in 17PBIDBS Database function relational database of client-server and 17PBIDDS A survey of basic table, graph, binary 17PBIDPS Lectures are oriented.	Biomedical Statistics Tobability theory and mathematical statistics. Classical, geometrical and Kolmogorov definitions of probability. Random variables, their transformations. Population and sample. Parameter estimators. Statistical tests. Database Systems principles, methodology of relational data model design and object data model. Database systems implementation using of SQL92 and script language VB inside postrelational database CACHE. Transitior distributed database systems. Both principles relational and postreational will practice and show. Database CACHE includes both principles relations. A specification of abstract data types (ADT). Specification and implementation of ADT: list, stact tree. Dynamic data structures and operations with them (effective searching, sorting, storing of data structures etc.). Representation of for choice of proper data structure. Computer Network ed to techniques required for safe and efficient communication in networks bases on telecommunication, local area and wireless techniques required for safe and efficient communication in networks bases on telecommunication, local area and wireless techniques required for safe and efficient communication in networks bases on telecommunication, local area and wireless techniques required for safe and efficient communication in networks bases on telecommunication, local area and wireless techniques required for safe and efficient communication in networks bases on telecommunication, local area and wireless techniques.	symmetrical and a Z,ZK r distributions, chair Z,ZK and script language a data processing. A inciples. It is datable Z,ZK ak, queue, set, arratiche data structure: Z,ZK anologies. Structure:	5 racteristics, 3 PHP inside Architecture pase service 5 sy, look-up s, strategies 5 s of network

- Extensible Stylesheet Language Transformations, multi users document edit, macros creating; MS Excel - cell and sheet format, working with functions and equations, data analysis, macros creating and interactive aplications; MS Access - relation database and database in MS Access, creating new database and tables, data searching and sorting, relations betwen

_	ta Access Pages (DAP)', database security; MS Project - Project establishing, tasks, resources, duration monitoring, task revision, projections, working with the text and objects, graphics and multimedia, automatic, interactive and web presentations, makros; MS FrontPagramiliarizing with functionality and effective usage; mutual integration of applications MS Office package		
17PBIEHT	eHealth and Telemedicine	Z,ZK	5
	lications - WHO definition, history of telemedicine, relations to development of ICT. Health care organization. Communication in health	, ,	
• • • • • • • • • • • • • • • • • • • •	emedicine, hospital information systems, legal issues. Information technology as support of shared and distributed health care. Data se health care. Image information processing. Networks and Internet in health care.		
17PBIEUI		Z,ZK	2
ITEDIEUI	Expert Systems and Artificial Intelligence for Medicine The course is aimed at providing theoretically deeper knowledge in the area of Expert systems and artificial intelligence in medical medical intelligence in the area of Expert systems and artificial intelligence in medical intelligence in the area of Expert systems and artificial intelligence in medical intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems and artificial intelligence in the area of Expert systems are also are als		3
17PBIEZP	Economics of Health Services	KZ	3
	onomics of medical facilities, main terms. Investments in healthcare - economic balance. Investment planning and management, intercon		
and investments,	contracts. Costs incurred by legislation and mere operation of the technology. Return on investments, risk analysis. Commodity knowled	ge of consumables	and spare
	parts. Prices of medical devices consumables and tools.		
17PBIFY1	Physics I.	KZ	3
Physics I course	will allow students to acquire and strengthen knowledge in these branches of physics: mechanics, thermodynamics and solid state physics	sics. Through the	course we
	also touch the limits of the classical Physics.		
17PBIFY2	Physics II.	KZ	3
•	course introduces fundamentals and applications of electromagnetic fields. The covered topics include electromagnetic interaction, ele		
electromagnetic	field, Maxwell's equations, electromagnetic radiation, fundamentals of quantum physics, atomic nucleus and elementary particles, and	I interaction of radi	ation with
47DDIEV2	matter.	V7	2
17PBIFY3	Physics III. It is the previous courses Physics I. and Physics II. In this set of courses the main emphasis is placed on the understanding of priciples are	KZ	3
THE COURSE EXTERIO	physical examples. In Physics III. course we study waves, optics and lasers. We concentrate on practical examples and experim	=	e standard
17PBIGZS	Biosignals Genesis and Processing	KZ	3
	with origins and description of the most important electric and non-electric biological signals. The principles of generation, recording an		-
· ·	The studied signals involve native and evoked biosignals, including biological signals of the heart, brain, muscles, nervous system, au		
-	astro-intestinal system etc. Advanced methods of digital biosignal processing, spectrum analysis, modern methods of artificial intelligence, classification, graphic presentation of results. Adaptive segmentation, artificial neural networks for signal processing.		- 1
17PBIIAB	Information Analysis of Biological Systems & Signals	KZ	3
Information entro	py, applications. Average mutual information. Continuous and discrete communication channel. Relationship of information and thermo	dynamic entropy. F	Principle of
maximal entr	opy. Biosystem organization, models and system identification. Introduction of statistical decision making, testing of statistical hypothes	sis, Bayessian app	roach.
17PBIIPZ	Implementation and Support of IS in Health Care	Z,ZK	3
-	pasic information about specific processes of implementation and support of large Information Systems in health care area. Implementation		· ·
_	project management theory description, implementation methodology standards and their application. The best practice and experience	_	
	mentation are documented as well. The description of the implementation process starts by decomposition of the Information System to requirements. Implementation team structure and roles of implementation team members are discussed and described as well as time	-	
	necessary documents contented and structure. Logical part of the course is costs calculation, implementation process planning meth		
	ent. The second part of the course is oriented on the large Information System and its users support. The course presents the typical S		
_	endor and customer duties and rights, classification of user's requirements, response procedures and time of vendor's call center and		
	will be informed about internal processes of required services handling on customer and support services vendor side.		
17PBIIT	Information Technologies	Z,ZK	3
Computer history,	structure of computers, motherboard, processors, memody, graphical card, computer buses, BIOS, I/O devices, server, desktop, noteb	ook, pocket PC, da	nta storage,
	memory card, OS, tasks and memory management, printers scanner, multimedial devices, mass data storage, multitasking, multiproc	_	
	programming languages, power test, network, LAN, WAN, interner, TCP/IP, HTTP, FTP etc., client-server, gate, router, using IT in med		
17PBIITH	IT for Handicapped People	KZ	3
17PBIITP	Integral Calculus	Z,ZK	5
-	introduction to integral calculus and integral transforms. Integral calculus: primitive function, indefinite integral, properties and methods		
	istitution, partial fractions), definite integral, properties, Newton-Leibnitz fundamental theorem, simple applications of both indefinite an fferential equations (ODEs) (1st order ODEs with separable variables, linear 1st order homogenous as well as non-homogenous ODEs,	-	
	penous ODEs with constant coefficients),intro to multiple integrals, particularly double integral and applications. Integral transforms: Lap		- 1
and non nome	Laplace transform and their application for solving nth order linear ODEs with constant coefficients.	nado transform am	2 11110100
17PBIJA3	English III.	KZ	4
	e subject is to extend the wordstock of students in the field of biomedical engineering and its terminology. The subject is primarily focus		
17PBIJV	communicative and speaking skills.		
	Communicative and speaking skills. Java	KZ	3
The eadjoor is		ı	
	Java	programming in c	#. In the
framework of exer	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of	programming in c	#. In the ogramming
framework of exer language, design	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exit interfaces, technologies for creating the presentation layer of a program.	programming in c commands of a pr ceptions, introduc	#. In the ogramming tion to user
framework of exer language, design	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I	programming in c commands of a pr cceptions, introduc Z,ZK	#. In the ogramming tion to user
framework of exer language, design	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I acquainted with principles of problems of particular most important clinical branches, with most important features of diseases and post	programming in c commands of a pr cceptions, introduc Z,ZK	#. In the ogramming tion to user
framework of exer language, design 17PBIKO1 The student is	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I acquainted with principles of problems of particular most important clinical branches, with most important features of diseases and post Emphasize is put on diseases principally participating in the mortality in the Czech Republic or occurring most frequently.	programming in commands of a proceptions, introduce Z,ZK ssibilities of their trees.	#. In the ogramming tion to user 3 eatment.
framework of exer language, design 17PBIKO1 The student is 17PBIKO2	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I acquainted with principles of problems of particular most important clinical branches, with most important features of diseases and post Emphasize is put on diseases principally participating in the mortality in the Czech Republic or occurring most frequently. Principles of Clinical Branches II	programming in commands of a proceptions, introduce Z,ZK esibilities of their tra	#. In the ogramming tion to user 3 eatment.
framework of exertanguage, design 17PBIKO1 The student is 17PBIKO2 The student is according to the student is	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I acquainted with principles of problems of particular most important clinical branches, with most important features of diseases and post Emphasize is put on diseases principally participating in the mortality in the Czech Republic or occurring most frequently. Principles of Clinical Branches II quainted with principles of problems of particular clinical disciplines, with most important features of diseases and possibilities of their tr	programming in c commands of a proceedings, introduced a command of a proceeding and a command of their transfer and their tran	#. In the orgamming tion to user 3 eatment. 2 ze is put on
framework of exertanguage, design 17PBIKO1 The student is 17PBIKO2 The student is according to the student is	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I acquainted with principles of problems of particular most important clinical branches, with most important features of diseases and post Emphasize is put on diseases principally participating in the mortality in the Czech Republic or occurring most frequently. Principles of Clinical Branches II quainted with principles of problems of particular clinical disciplines, with most important features of diseases and possibilities of their traily affecting the mortality in the Czech Republic and those, in which non-pharmacological prevention is possible and effective. The contact of the programming language Java. Builds on the knowledge gained in the course of cisease, or the course of cisease and debugging and testing tasks, the methodology and testing tasks,	programming in c commands of a proceedings, introduced a command of a proceeding and a command of their transfer and their tran	#. In the orgamming tion to user 3 eatment. 2 ze is put on
framework of exertanguage, design 17PBIKO1 The student is 17PBIKO2 The student is acc diseases principa	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I acquainted with principles of problems of particular most important clinical branches, with most important features of diseases and post Emphasize is put on diseases principally participating in the mortality in the Czech Republic or occurring most frequently. Principles of Clinical Branches II quainted with principles of problems of particular clinical disciplines, with most important features of diseases and possibilities of their traily affecting the mortality in the Czech Republic and those, in which non-pharmacological prevention is possible and effective. The contact of the medical management.	programming in c commands of a proceptions, introduce Z,ZK esibilities of their tree. Z,ZK eatment. Emphasiculusion of the bloc	#. In the orgamming tion to user 3 eatment. 2 ze is put on k is aimed
framework of exertanguage, design 17PBIKO1 The student is: 17PBIKO2 The student is accidiseases principated.	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I acquainted with principles of problems of particular most important clinical branches, with most important features of diseases and post Emphasize is put on diseases principally participating in the mortality in the Czech Republic or occurring most frequently. Principles of Clinical Branches II quainted with principles of problems of particular clinical disciplines, with most important features of diseases and possibilities of their traily affecting the mortality in the Czech Republic and those, in which non-pharmacological prevention is possible and effective. The contact of the programming language Java. Builds on the knowledge gained in the course of cisease, or the course of cisease and debugging and testing tasks, the methodology and testing tasks,	programming in c commands of a proceedings, introduced a proceeding and a proceeding a proceding a proceding a proceding a proceding a proceeding a proceeding a proceding a proce	#. In the orgamming tion to user 3 eatment. 2 ze is put on k is aimed
framework of exertanguage, design 17PBIKO1 The student is: 17PBIKO2 The student is accidiseases principation 17PBILAD The course is an in	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I acquainted with principles of problems of particular most important clinical branches, with most important features of diseases and post Emphasize is put on diseases principally participating in the mortality in the Czech Republic or occurring most frequently. Principles of Clinical Branches II quainted with principles of problems of particular clinical disciplines, with most important features of diseases and possibilities of their traily affecting the mortality in the Czech Republic and those, in which non-pharmacological prevention is possible and effective. The contact at principles of the medical management. Linear Algebra and Differential Calculus	programming in c commands of a proceedings, introduced a proceeding commands of a proceeding commands of a proceeding command commands of their transfer commands of the proceeding commands of a proceeding command commands of a proceeding command commands of a proceeding commands of a procee	#. In the orgamming tion to user 3 eatment. 2 ze is put on k is aimed 5 n, matrices,
framework of exertanguage, design 17PBIKO1 The student is accepted to the	Java focused on understanding students with object-oriented programming language Java. Builds on the knowledge gained in the course of cises will be discussed the description of integrated environment, the structure of the programme and debugging and testing tasks, the methodology algorithms, basic control structures, data types, memory management, design and the use of classes, the treatment of exinterfaces, technologies for creating the presentation layer of a program. Principles of Clinical Branches I acquainted with principles of problems of particular most important clinical branches, with most important features of diseases and post Emphasize is put on diseases principally participating in the mortality in the Czech Republic or occurring most frequently. Principles of Clinical Branches II quainted with principles of problems of particular clinical disciplines, with most important features of diseases and possibilities of their traily affecting the mortality in the Czech Republic and those, in which non-pharmacological prevention is possible and effective. The contact at principles of the medical management. Linear Algebra and Differential Calculus attroduction into linear algebra and calculus of one variable. Linear algebra part consists of: systems of linear equations and their solutions	programming in c commands of a proceedings, introduced a proceeding commands of a proceeding commands of a proceeding commands of their transfer commands of the proceeding commands of a proceeding command commands of a proceeding commands of a proceeding commands of the proceeding commands o	#. In the orgamming tion to user 3 eatment. 2 ze is put on k is aimed 5 n, matrices, ences and

17PBILDT	Laboratory Diagnostics and Technology	Z,ZK	4
	stics and Technology introduces the principles of bioanalytical methods used in clinical diagnostics. Emphasis is put on the data type: ell on the tools for their analysis. During the tutorials students will be introduced into the basic principles of computer data managing		se methods
17PBILOD	Medical and Nursing Documentation	KZ	3
	used on basic principles and concepts of medical and nursing documentation. The topic for this course is the main structure of the ambu		
	atient hospitalization, the emphasis will be given to the specific clinical departements, such as oncology, internal medicine, traumatole		
also provides an i	introduction to main code classification systems (scores) specific to individual disciplines - TNM, FIGO, Child - Pugh, Karnofsky, Ishal	k, etc. In the last le	ssons the
17PBILOG	students learn the fundamentals of nursing documentation and the basic standards of nursing care. Logics	Z,ZK	4
	ا gic circuit, logic function. Bool's algebra. Representation (models) of logic functions: expression/formula, table, cube, map, logical and		- 1
	sequential logic nets. Huffman's schema. Minimization of expressions for combinatorial logical nets with one and more outputs. Normal		
•	ms. Minimization based on operations of Bool's algebra in expressions, in a unit cube, in a truth table (Quin-McCluskey's method), in a	•	
	cal terms, circuits and blocks. Synthesis of combinatorial logic circuits NOT, AND, OR, NAND, NOR. Synthesis of combinatorial logic of sequential behavior. Finite automata: Mealy and Moore automata. Memory circuits. Analysis and synthesis of synchronized sequential r		
	e logic (PL): language, terms, formula, substitution and basic syntactic terms, semantics: structures for predicate logic, evaluation, eva	-	-
	Axiomatic system of PL: axioms, inference rules, concept of a proof, reasoning theorem.		
17PBILPZ	Medical Devices & Equipment	KZ	3
	categories. Electrical safety of medical devices. Biopotentials amplifiers. Electrocardiographs, electromyographs and electroencephalo liac output measurement. Blood pressure measurement. Cardiac frequency measurement. Phonocardiography. Pulse oxymetry. Medic		
blood flow and card	and electrosurgery medical devices. Therapeutic medical devices. Implantable medical devices. Telemetry. Medical devices for au		Jaminalation
17PBILTR	Medical Terminology	Z	1
	ade acquainted with particular terms flowing from latin but also greek expressions during their lectures. Students are continuously inf		of whole
4700000	diagnosis and therapeutical procedures. Education is combined with continuous knowlegde check up through the use of test		
17PBIMS	Modelling & Simulation Modelling - fundamentals. Compartmental models. Models of population dynamics - single species population, interacting population, or	Z,ZK	5 discrete
wodening and Sil	models. Models with age distribution. Epidemic models - model of SIR structure, criss-cross models, models of venereal disea		, 41301616
17PBIMTB	Microprocessors in Medicine	KZ	3
	bedded microprocessor systems in medicine, principles and structure of microcontrolers, logical circuits. Interconnection with commo		II.
DA converters, seri	al communication, WIFI, Bluetooth a GPRS communication. Examples of embedded systems on architectures 8051, AVR, PIC and ARI software development fo embedded systems.	M. Introduction to m	ultiplatform
17PBIMTL	Matlab	KZ	3
	of MATLAB environment. Numerical formats. Variables and matrices. Complex numbers. Rounding numbers. Basic instructions. Matric		
Simulink (basic de	escription, exercise formulation, parameters entry). Conditional and cyclical instructions. Script creation, functions, debugging. Continu	uous and discrete p	processes.
47DDIM)/D	Symbolical solutions. Graphical user interface creation. Applications in MATLAB.	1/7	
17PBIMVP Methodical starti	Research Methodology ng points of research. Methods and technology of research. Logic of scientific research. Theoretical starting points of research. Scien	KZ tific information as	3 a fool for
everyday work. Stru	ucture of scientific information, possibility for their acquisition, methods of processing and application in practice. Description of princip	ples for searching f	or scientific
	information. Description of specific systems, namely from health service. Final report.	_	
17PBIMZB	information. Description of specific systems, namely from health service. Final report. Biosignal Measuring & Processing in Real Time	KZ	3
17PBIMZB Real-time, latence	information. Description of specific systems, namely from health service. Final report. Biosignal Measuring & Processing in Real Time y, interrupts. Design of the measuring chain - input circuits, bus structure of the digital part, signal processing unit (microcontrolers, si	KZ gnal processors, s	3 ingle chip
17PBIMZB Real-time, latence	information. Description of specific systems, namely from health service. Final report. Biosignal Measuring & Processing in Real Time	KZ gnal processors, s	3 ingle chip
17PBIMZB Real-time, latence industrial comp	information. Description of specific systems, namely from health service. Final report. Biosignal Measuring & Processing in Real Time y, interrupts. Design of the measuring chain - input circuits, bus structure of the digital part, signal processing unit (microcontrolers, signaters, personal computers). Operating system Windows and real time, serious real-time operating systems. Multitasking and preemp multithreading. Algorithms of real-time biosignal processing. Hospital Information Systems	KZ Ignal processors, s tion, priority of proc	3 ingle chip cesses,
17PBIMZB Real-time, latence industrial comp 17PBINIS Definition of hospita	information. Description of specific systems, namely from health service. Final report. Biosignal Measuring & Processing in Real Time y, interrupts. Design of the measuring chain - input circuits, bus structure of the digital part, signal processing unit (microcontrolers, signaters, personal computers). Operating system Windows and real time, serious real-time operating systems. Multitasking and preemp multithreading. Algorithms of real-time biosignal processing. Hospital Information Systems all episodes, organization and workflow of hospital care. Data items and structuring electronic patient record. The structure of patient-o	KZ gnal processors, s tion, priority of proc Z,ZK priented databases,	3 ingle chip cesses,
17PBIMZB Real-time, latence industrial comp 17PBINIS Definition of hospita and correction of i	information. Description of specific systems, namely from health service. Final report. Biosignal Measuring & Processing in Real Time y, interrupts. Design of the measuring chain - input circuits, bus structure of the digital part, signal processing unit (microcontrolers, signaters, personal computers). Operating system Windows and real time, serious real-time operating systems. Multitasking and preemp multithreading. Algorithms of real-time biosignal processing. Hospital Information Systems	KZ gnal processors, s tion, priority of proc Z,ZK priented databases, ansfer and discharge	3 ingle chip cesses, 5 monitoring ge module.
17PBIMZB Real-time, latence industrial comp 17PBINIS Definition of hospita and correction of it The structure of elenursing care. Che	information. Description of specific systems, namely from health service. Final report. Biosignal Measuring & Processing in Real Time y, interrupts. Design of the measuring chain - input circuits, bus structure of the digital part, signal processing unit (microcontrolers, signaters, personal computers). Operating system Windows and real time, serious real-time operating systems. Multitasking and preempt multithreading. Algorithms of real-time biosignal processing. Hospital Information Systems all episodes, organization and workflow of hospital care. Data items and structuring electronic patient record. The structure of patient-oncompleteness. Record of medical information and data, display and prints of medical records and information. Patient admission, tracectronic medical record forms. Medical order and record of drug and infusion therapy. Electronic patient record, registration physiologic cking the quality of care, standardization and accreditation of providers of hospital care. Protocols of patient care. Orders, findings an	KZ Ignal processors, s tion, priority of prod Z,ZK Intented databases, ansfer and dischargeal condition of the d neutral services,	3 ingle chip cesses, 5 monitoring ge module. patient and structure,
17PBIMZB Real-time, latence industrial comp 17PBINIS Definition of hospita and correction of ithe structure of elenursing care. Che format of order sta	information. Description of specific systems, namely from health service. Final report. Biosignal Measuring & Processing in Real Time y, interrupts. Design of the measuring chain - input circuits, bus structure of the digital part, signal processing unit (microcontrolers, signaters, personal computers). Operating system Windows and real time, serious real-time operating systems. Multitasking and preempt multithreading. Algorithms of real-time biosignal processing. Hospital Information Systems all episodes, organization and workflow of hospital care. Data items and structuring electronic patient record. The structure of patient-oncompleteness. Record of medical information and data, display and prints of medical records and information. Patient admission, tractronic medical record forms. Medical order and record of drug and infusion therapy. Electronic patient record, registration physiologic cking the quality of care, standardization and accreditation of providers of hospital care. Protocols of patient care. Orders, findings an atus monitoring. Structured patient record and its interpretation. Intensive care and resuscitation. Resuscitation record. Calculation of	KZ Ignal processors, s tion, priority of proc Z,ZK Interiented databases, ansfer and dischargeal condition of the d neutral services, physiological liquic	3 ingle chip cesses, 5 monitoring ge module. patient and structure, I, ions and
17PBIMZB Real-time, latence industrial comp 17PBINIS Definition of hospita and correction of i The structure of ele nursing care. Che format of order state energy balance at	information. Description of specific systems, namely from health service. Final report. Biosignal Measuring & Processing in Real Time y, interrupts. Design of the measuring chain - input circuits, bus structure of the digital part, signal processing unit (microcontrolers, signaters, personal computers). Operating system Windows and real time, serious real-time operating systems. Multitasking and preempt multithreading. Algorithms of real-time biosignal processing. Hospital Information Systems all episodes, organization and workflow of hospital care. Data items and structuring electronic patient record. The structure of patient-oncompleteness. Record of medical information and data, display and prints of medical records and information. Patient admission, tracectronic medical record forms. Medical order and record of drug and infusion therapy. Electronic patient record, registration physiologic cking the quality of care, standardization and accreditation of providers of hospital care. Protocols of patient care. Orders, findings an atus monitoring. Structured patient record and its interpretation. Intensive care and resuscitation. Resuscitation record. Calculation of not classification of severity of patient condition. Surgical care, surgery planning, traffic management of operating rooms. Anesthesiological care, surgery planning, traffic management of operating rooms.	KZ Ignal processors, s tion, priority of proc Z,ZK Interiented databases, ansfer and dischargeal condition of the id neutral services, physiological liquic ogy and operationa	3 ingle chip cesses, 5 monitoring ge module. patient and structure, I, ions and I protocol.
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17PBIPPZ	Programming Tools	KZ	3
Introduction to mod	lern software resources in MS Windows and GNU/Linux environment - office applications, basic visualisation of experimental data, g	raphical presentat	ion, Internet
	cation. Data formats, compatibility. Selected parts of the course are compatible with the ECDL (European Computer Driving Licence)		
17PBIRBL	Robotics in Medicine cs in medicine and laboratory technics what kind of task is solving, synthesis of kinematics according to the task processed by robot	KZ	2
	cs in medicine and laboratory technics what kind of task is solving, synthesis of kinematics according to the task processed by robot /), kinematics a dynamics of robot arm - computing methodology, verification of obtained models in Matlab environment, sensors and d		
3(,	in medicine, possible robot control paradigms - according human (operator) task.	, , , , , , , , , , , , , , , , , , , ,	
17PBISM	Mathematical Seminars	KZ	3
17PBISPR	Term Project	KZ	5
Basic communication	on and presentation skills. Creation of presentations and written texts. Typography rules. Types, purpose and requirements of technic	al presentations a	nd technical
17PBISRK	texts. Writing a commented bibliographic search. Quality Management Systems	KZ	3
	Quality Management. Systems nagement. Relevant norms. Quality of the hospital processes and systems. Improvement and reengineering of the processes. Eurom	I	_
	ng and of realization processes of the health care facilities, map of the processes and subprocesses. Project of the integrated manage		
-	Possibilities of application of TQM within the health care facility. Relevant HW and SW.		
17PBITEL	Theory of Electrical Engineering	KZ	3
	and AC currents. Electrical curcuits including R, L, C. Power of electric current, thermal effect of electric current. Distribution of elect		
-	s. Input resistance and impedance, idle voltage, inner resistance and impedance of the source, mutual loading of the source and electives of circuits in time and frequency domain. Transient action in DC circuits, frequency characteristics of the L/C circuit. Electrical curr		-
• .	es of circuits in time and frequency domain. Hansieffit action in De circuits, frequency characteristics of the De circuit. Electrical cur- lation of the semiconductor crossing, properties in the forward and reverse direction. Bipolar transistor - transistor effect, basic principle		
•	olar transistors with complementary of conductance (CMOS). Electromagnetic effects (induction, magnetization, force effect). Electromagnetic	•	
interference, electro	omagnetic compatibility. Soft and hard magnetic materials. Transformers construction and parameters. Magnetic recording and reprodu	uction of signals. E	lectromotors
47001T144	principles.	7.71	
17PBITM1	Fundamentals of Theoretical Medicine I	Z,ZK	3
17PBITM2	Fundamentals of Theoretical Medicine II a about particular physiological processes, influence of physics strengths on human organism, physical treatment methods, physiolog	Z,ZK	3
Basic iniornation	r about particular physiological processes, inilidence of physics strengths of Human organism, physical treatment methods, physiolog	Jicai background c	or effect of
17PBITPR	Team Project	KZ	6
	ation and presentation skills, including team work, team heading and project management. Creation of presentations and written tex		-
	purpose and requirements of technical presentations and technical texts. Writing a commented bibliographic search.		
17PBITWA	Web Application Development	KZ	3
	nunication and HTTP protocol, web development applications standards (HTML, XHTML, XML, CSS, javascript), web developing languages and the control of the co	-	-
server, modern app	proaches in web application development, developing tools, design web application and realization, web hypermedial systems, e-lea of medical informational web systems.	rning systems on v	web, design
17PBITZT	Theory and Practice of Journalistic Writing	Z.ZK	5
	t is to learn about theory and practice of journalism. Students will be introduced into problematic of mass communication, types of m	,	-
	basics of journalism and internet as instrument of communication.		
17PBIUSS	Introduction to Systems and Signals	Z,ZK	5
To introduce stud	dents to basics of theory of signals and systems. To explain main principles on applications from biology and medicine. To become a	equainted with bas	sic mutual
17PBIVAA	relations in computer laboratories by means of MATLAB. Multi tion Application Architecture in Riemadicine	KZ	3
I/PDIVAA	Multi-tier Application Architecture in Biomedicine Students will get acquainted with the design and usage of the client-server software architecture namely in biomedicine applica		3
17PBIVZP	Methods of Healthcare Reporting	KZ	2
	sic principles of a general system for health care coverage. System of health care coverage in the Czech Republic. Legislation on hea	I	I
	of regulation of health care coverage. Methods for health care reporting. IT systems supporting health care reporting. Performance co	0 / 1	
	nents, payments for diagnosis. Cost record and coverage of especially high-priced items. Prescription of pharmaceuticals and medical		•
Means of data tran	sfer to health insurance companies. Auditing health care coverage; inspectors in health insurance companies. Health insurance com System of regressive refunds. Health documentation.	panies in the Czec	in Republic.
17PBIZEL	The Basic Use of E-learning	Z,ZK	3
	y subject entitled "The Basic Use of e-learning" is to provide students with basic knowledge in the field of e-learning and to develop the		-
	ng materials and courses as a result of acquired knowledge. Furthermore, students will learn how to study the specialized literature a		
•	asics of e-learning will provide the students with the knowledge of history and present situation of e-learning, the students will acquire	•	
aspects of e-learnin	ig, of LMS systems and other tools for creating of e-learning materials and of possibilities for assessing the quality of e-learning. Empha of practical skills for creating e-learning materials and e-learning courses.	asis will be placed	on acquiring
17PBIZIZ	Information Sources in Health Care	Z,ZK	3
	urces: primary information resources, structure of the professional communication, secondary information resources, bibliographic de		I
and registries: ima	ge and pharmacological databases, national medical registries - purpose, legislation, data entry, accessibility of outputs, forms of da	ta mining. Internet	resources:
* *	et resources in health care, Internet search services, strategy and tactics of the Internet search. Evaluated information resources: Ev		
	ration, EBM databases, interpretation of meta-analysis, recommended guidelines. Quality of bibliographic information: Impact factor,		=
	d effectiveness of information search in databases Quality of Internet information: visit rate, citation, criteria for quality web presentat nformation resources for the public: credibility evaluation of resources, sociological aspects of information optimality, interactive resou		
17PBIZLN	Legislation in Health Care and Technical Standarts	KZ	3
1	w. Law No. 96/2004 and applicable regulations. EU Directives. Legal technical product requirements. National government decrees. In	I	I
publication of techi	nical norms. Technical norms in health care. Nuclear law. Procedures concerning introduction of medical devices. Clinical testing. Fur	nctional position of	f the testing
4======	rooms. Legislation concerning GMP, GLP and GCP.		
17PBIZOD	Image Data Processing	Z,ZK	5
_	representation, linear 2D systems, 2D spectrum, Digital representation of images, Basic image characteristics: brightness, contrast, re ete Fourier transform, discrete cosine transform, image enhancement, geometric operations, image filtering, morphological operatior		-
5.59.4.11, 515016	segmentation, basic principles of image compression.		,iago
17PBIZS	Imaging Systems	KZ	3
-	diation and relationship to the medical imaging systems. Imaging theory fundamentals. 2D Fourier transform and related applications.		
systems. Optical i	imaging systems. Television (TV) imaging systems (including videoendoscopy and capsule imaging). Fundamentals of image proces	sing. imaging syst	ems using

infrared radiotion (termovision systems). X-ray imaging systems. X-ray TV medical imaging systems. Nuclear medical imaging systems. Ultrasound medical imaging systems Doppler systems. Computed tomography (basic idea, schematic system arrangement, basic physical principle, development generation, basic principles of reconstruction) Magnetic resonance imaging. Positron emission tomography (PET) and Single photon emission computed tomography (SPECT) Specialized medical imaging systems. Lectures and laboratory exercises offer to students view on the medical image data formation, on the sensing and scanning principles, on the digitization and processing, on the functional principle and image sensing devices as well. There are very important mutual relationships, which are important from the point of view of subject and study branch interdisciplinarity.

For updated information see http://bilakniha.cvut.cz/en/FF.html Generated: day 2024-05-18, time 07:22.