Study plan

Name of study plan: Bachelor specialization Software Engineering, part-time, in Czech, 2021

Faculty/Institute/Others: Department: Branch of study guaranteed by the department: Welcome page Garantor of the study branch: Program of study: Informatika Type of study: Bachelor combined Required credits: 153 Elective courses credits: 27 Sum of credits in the plan: 180 Note on the plan: Tato verze studijního plánu je ur ena pro ro níky, které byly p ijaty ke studiu od akademického roku 2021/2022 do kombinované formy studia bakalá ského programu. . Garant: Ing. Michal Valenta, Ph.D.&email: michal.valenta@fit.cvut.cz

Name of the block: Compulsory courses in the program Minimal number of credits of the block: 106 The role of the block: PP

Code of the group: BIK-PP.21 Name of the group: Compulsory Courses of Bachelor Study Program Informatics, part-time study, version 2021

Requirement credits in the group: In this group you have to gain 106 credits Requirement courses in the group: In this group you have to complete 20 courses Credits in the group: 106

Note on the g	roup: G	uarantor:				
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
BIK-AG1.21	Algorithms and Graphs 1 Radek Hušek, Dušan Knop Dušan Knop Dušan Knop (Gar.)	Z,ZK	5	14KP+4KC	Z	PP
BIK-AAG.21	Automata and Grammars Ond ej Guth, Eliška Šestáková Jan Holub Jan Holub (Gar.)	Z,ZK	5	14KP+4KC	z	PP
BI-BAP.21	Bachelor Thesis Zden k Muziká Zden k Muziká (Gar.)	Z	14		L,Z	PP
BIK-BPR.21	Bachelor project Zden k Muziká Zden k Muziká Zden k Muziká (Gar.)	Z	1		Z,L	PP
BIK-DBS.21	Database Systems Monika Borkovcová, Michal Valenta, Andrii Plyskach Monika Borkovcová Monika Borkovcová (Gar.)	Z,ZK	5	14KP+6KC	; L	PP
BIK-DML.21	Discrete Mathematics and Logic Eva Pernecká Daniel Dombek Eva Pernecká (Gar.)	Z,ZK	5	14KP+4KC	z	PP
BIK-KAB.21	Cryptography and Security Filip Kodýtek, Róbert Lórencz, Ji í Bu ek, Ji í Dostál Róbert Lórencz Róbert Lórencz (Gar.)	Z,ZK	5	14KP+4KC	L	PP
BIK-LA1.21	Linear Algebra 1 Karel Klouda Karel Klouda Karel Klouda (Gar.)	Z,ZK	5	14KP+4KC	z	PP
BIK-MA1.21	Mathematical Analysis 1 Petr Olšák Ivo Petr Ivo Petr (Gar.)	Z,ZK	5	14KP+4KC	L	PP
BIK-MA2.21	Mathematical Analysis 2 Petr Olšák Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	6	21KP+4KC	; Z	PP
BIK-OSY.21	Operating Systems Michal Šoch, Jan Trdli ka, Pavel Tvrdík Michal Šoch Michal Šoch (Gar.)	Z,ZK	5	14KP+4KC	; L	PP
BIK-PSI.21	Computer Networks Vladimír Smotlacha, Yelena Trofimova Vladimír Smotlacha Vladimír Smotlacha (Gar.)	Z,ZK	5	14KP+4KC	L	PP
BIK-PST.21	Probability and Statistics Petr Novák, Pavel Hrabák, Daniel Vašata Pavel Hrabák Pavel Hrabák (Gar.)	Z,ZK	5	14KP+4KC	Z	PP

BIK-PA1.21	Programming and Algorithmics 1 Radek Hušek, Miroslav Balík, David Bernhauer, Jan Trávní ek, Ladislav Vagner, Josef Vogel Jan Trávní ek Jan Trávní ek (Gar.)	Z,ZK	7	14KP+8KC	Z	PP
BIK-PA2.21	Programming and Algorithmics 2 Radek Hušek, Jan Trávní ek, Ladislav Vagner, Josef Vogel, Barbora Kolomazníková Jan Trávní ek Jan Trávní ek (Gar.)	Z,ZK	7	14KP+6KC	L	PP
BIK-SAP.21	Computer Structure and Architecture Martin Da hel, Št pán Pechman Martin Da hel Martin Da hel (Gar.)	Z,ZK	5	14KP+6KC	L	PP
BIK-TZP.21	Technological Fundamentals of Computers Martin Novotný, Martin Da hel, Kate ina Hyniová Martin Da hel Martin Da hel (Gar.)	Z,ZK	5	14KP+4KC	Z	PP
BIK-GIT.21	SW Development Technologies Petr Pulc Petr Pulc (Gar.)	Z	3	14KP	Z	PP
BIK-TDP.21	Documentation and Presentation Dana Vynikarová Dana Vynikarová Dana Vynikarová (Gar.)	KZ	3	14KP+4KC	Z,L	PP
BIK-UOS.21	Unix-like Operating Systems Jakub Žitný, Petr Zemánek Petr Zemánek Zden k Muziká (Gar.)	KZ	5	14KP+4KC	Z	PP
	f the courses of this group of Study Plan: Code=BIK-PP.21 Name=C time study, version 2021	Compulsory	Course	s of Bache	lor Stu	dy Progran
BIK-AG1.21	Algorithms and Graphs 1			Z	ZK	5
The course is presente	d in Czech. The course covers the basics from the efficient algorithm design, data structures	s, and graph the	ory, belong	ing to the core	knowledg	e of every
computing curriculum.	Students learn techniques of proofs of correctness of algorithms and techniques of asymptot	ic mathematics	for estimati	on of their corr	plexity in	the best, worse
U (ourse includes basics from probability theory needed for understanding randomized algorithms	s). Within exercis	es students	s learn applicat	ions of stu	udied algorithm
for solving practical pro	oblems.					
BIK-AAG.21	Automata and Grammars			Z.	ZK	5
	d to basic theoretical and implementation principles of the following topics: construction, use				-	
	translation finite automata, construction and use of pushdown automata, hierarchy of formal		owledge ac	quired through	the modu	ile is applicable
to creation of algorithm	ns for pattern matching, data compression, translation, simple parsing, and creation of digital	circuits.				
BI-BAP21	Bachelor Thesis				7	14

BIK-BPR.21 Bachelor project

1. At the beginning of the semester, the student reserves the topic of the bachelor's thesis and connects with the supervisor. He / she will arrange the partial tasks that he / she will perform during the semester to process the assignment. If he completes these tasks, the supervisor will award him a credit from the subject BI-BPR at the end of the semester. 2. The external supervisor enters the information on granting the credit using the form "Granting credit from the external supervisor of the final thesis" (http://fit.cvut.cz/student/studijni/formulare). The completed and signed form will be handed over by the student to the head of the Department of Defense, who will record the credit in KOS. 3. If the topic of the work that the student has reserved is formulated more generally, the tasks assigned to him by the supervisor for the semester should be aimed primarily at fine-tuning the assignment so that the assignment can be supplemented and approved at the end of the semester. Z.ZK 5

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BIK-DBS.21 Database Systems

Students get acquainted with the architecture of the database engine and typical user roles. They learn to design the structure of a smaller data store (including integrity constraints) using a conceptual model and then implement them in a relational database engine. They get acquainted with the SQL language and also with its theoretical basis - relational database model. They will get acquainted with the principles of relational database schema normalization. They understand the basic concepts of transaction processing and control of parallel user access to a single data source. At the end of the course, students will be introduced to alternative nonrelational database models. BIK-DML.21 Discrete Mathematics and Logic 7.7K 5 Students will get acquainted with the basic concepts of propositional logic and predicate logic and learn to work with their laws. Necessary concepts from set theory will be explained.

Special attention is paid to relations, their general properties, and their types, especially functional relations, equivalences, and partial orders. The course also lays down the basics of combinatorics and number theory, with emphasis on modular arithmetics. Z.ZK

BIK-KAB.21 Cryptography and Security

		1 / 1	-				
Students will understan	d the mathematical foundations of cryptography and gain an overview of current cryptographic algorithms. They will be able t	o use cryptograph	nic keys and				
certificates in systems b	based on them and learn the basics of safe use of symmetric and asymmetric cryptographic systems and hash functions in a	pplications. Within	i labs, students				
will gain practical skills	will gain practical skills in using standard cryptographic methods with an emphasis on security and will also get acquainted with the basic procedures of cryptanalysis.						
BIK-LA1.21	Linear Algebra 1	Z,ZK	5				
We will introduce stude	nts to the basic concepts of linear algebra, such as vectors, matrices, vector spaces. We will define vector spaces over the fie	eld of real and con	nplex numbers				
and also over finite field	s. We will present the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian elii	mination method (GEM) and show				
the connection with line	ar manifolds. We define the regularity of matrices and learn to find their inversions using GEM. We will also learn to find eige	nvalues and eiger	vectors of a				
matrix. We will also dem	nonstrate some applications of these concepts in computer science.						
BIK-MA1.21	Mathematical Analysis 1	Z,ZK	5				
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We begin the course by introducing students to the set of real numbers and its properties, and we note its differences with the set of machine numbers. Then we study real sequences and real functions of a real variable. We gradually introduce the notions of limits of sequences and functions, continuous functions, and derivatives of functions. This theoretical foundation is then applied to root-finding problems (iterative method of bisection and Newton's method), construction of cubic interpolation (spline), and formulation and solution of simple optimization problems (i.e., the issue of finding extrema of functions). The course is closed with the Landau's asymptotic notation and methods of mathematical description of complexity of algorithms. BIK-MA2.21 Mathematical Analysis 2 Z.ZK

The course completes the theme of analysis of real functions of a real variable initiated in BIK-MA1 by introducing the Riemann integral. Students will learn how to integrate by parts and use the substitution method. The next part of the course is devoted to number series, and Taylor polynomials and series. We apply Taylor's theorem to the computation of elementary functions with a prescribed accuracy. Then we study the linear recurrence equations with constant coefficients, the complexity of recursive algorithms, and its analysis using the Master theorem. Finally, we introduce the student to the theory of multivariate functions. After establishing basic concepts of partial derivative, gradient, and Hessian matrix, we study the analytical method of localization of local extrema of multivariate functions as well as the numerical descent method. We conclude the course with the integration of multivariate functions. This course can be enrolled only after successful completion of the course BIK-MA1, which can be replaced by the course BIK-ZMA in the case of repetitive students.

BIK-OSY.21	Operating Systems	Z,ZK	5		
In this course that is a fol	n this course that is a follow-up of the Unix-like operating systems course students deepen their knowledge in areas of OS kernels, process and thread implementations, race conditions,				
critical regions, thread scheduling, shared resource allocation and deadlocks, management of virtual memory and data storages, file systems, OS monitoring. They are able to design					
and implement simple m	nultithreaded applications. General principles are illustrated on operating systems Solaris, Linux, or MS Windows.				
BIK-PSI.21	Computer Networks	Z,ZK	5		

The course introduces students to the principles of computer networking. It covers basic technologies, protocols, and services commonly used in local networks and in the Internet as well. The lectures will be amended by proseminars that introduce students into network programming and demonstrate the abilities of advanced network technologies. Students practically verify configurations and management of network devices in the lab within the environment of the operating systems Linux and Cisco IOS.

BIK-PST.21	Probability and Statistics	Z,ZK	5
-	isics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variable	,	le to apply basic
	le distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction	-	
estimations of unknown d	listributional parameters from random sample characteristics. They will also be introduced to the methods for testing statisti	cal hypotheses ar	nd determining
the statistical dependence	e of two or more random variables.		
BIK-PA1.21	Programming and Algorithmics 1	Z,ZK	7
Students gain the ability t	o formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, s	tructured, pointer	s), expressions,
statements, functions, co	ncept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searc	ching, sorting, and	d manipulating
with linked lists.			
BIK-PA2.21	Programming and Algorithmics 2	Z,ZK	7
Students know the instrur	nents of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack,	queue, enlargeab	le array, list, set,
table). They learn these s	kills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming (e.g., template pro	gramming,
copying/moving of objects	s, operator overloading, inheritance, polymorphism).		
BIK-SAP.21	Computer Structure and Architecture	Z,ZK	5
Students will get acquain	ted with the basic architecture and units of a digital computer, understand the structure, function, and implementation of ari	thmetic-logic unit	, controllers,
memory, I/O communicati	ion, methods of data transfers between the units. The logic design and the implementation of a program-controlled simple pro	ocessor is practica	ally implemented
	mable circuits (FPGA), a single-chip microcomputer, and modern design (EDA) tools.		
BIK-TZP.21	Technological Fundamentals of Computers	Z,ZK	5
Students get acquainted	with the fundamentals of digital and analog circuits, as well as basic methods of analyzing them. Students learn how compute	er structures look	like at the lowest
	I to the function of a transistor. They will understand why processors generate heat, why cooling is necessary, and how to re		•
	erating frequency are and how to raise them; why a computer bus needs to be terminated, what happens if it is not; how a d	computer power s	upply looks like
(in principle). In the labs,	students model the behavior of basic electrical circuits in SW Mathematica.		
BIK-GIT.21	SW Development Technologies	Z	3
This course is aimed at o	ne of the rudimental team software development technology - version control. To be more specific, we will introduce studen	ts to Git, the infor	mation manager
from hell, as Linus Torval	ds nicknamed it, and provide a comprehensive guide into its depths, as well as for day-to-day use.		
BIK-TDP.21	Documentation and Presentation	KZ	3
The course is focused on	the basics of creating electronic documentation with emphasis on the creation of technical reports of a larger scope, typical	ly final university f	heses. Students
learn to create text of a te	echnical report in the LaTeX system, process an electronic presentation using the LaTeX Beamer system, and practically pr	esent it in front of	classmates and
the teacher. The course is	s intended primarily for those students who have chosen the topic of their bachelor's thesis or will choose it within the first 1	4 days of teaching	g. Within the
exercises of the course, a	an active approach to the creation of individual parts of the bachelor's thesis is assumed.		
BIK-UOS.21	Unix-like Operating Systems	KZ	5
	ns represent a large family mostly open-source codes that kept bringing during the history of computers efficient innovative		
systems for computers ar	nd their networks and clusters. The most popular OS today, Android, has a unix kernel. Students get overview of basic prop	erties of this OS f	amily, such as
processes and threads, a	ccess rights and user identity, filters, or handling files in a file system. They learn to use practically these systems at the lev	el of advanced us	ers who are not
only able to utilize powerf	ul system tools that are available to users, but are also able to automatize routine agenda using the unix scripting interface.	, called shell.	

Name of the block: Povinné p edm ty specializace Minimal number of credits of the block: 40 The role of the block: PS

Code of the group: BIK-PS-SI.21

Name of the group: Compulsory courses of specialization Software engineering, part-time study, version 2021

Requirement credits in the group: In this group you have to gain 40 credits Requirement courses in the group: In this group you have to complete 8 courses Credits in the group: 40 Note on the group:

Guarantor: Ing. Michal Valenta, Ph.D., email: michal.valenta@fit.cvut.cz

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
BIK-KOM.21	Conceptual Modelling Robert Pergl, Mohamed Bettaz Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	14KP+4KC	; Z	PS
BIK-OOP.21	Object-Oriented Programming Filip K ikava, Filip íha Filip K ikava Filip K ikava (Gar.)	Z,ZK	5	14KP+4KC	Z	PS
BIK-PPA.21	Programming Paradigms Jan Janoušek Jan Janoušek (Gar.)	Z,ZK	5	14KP+4KC	Z	PS
BIK-SWI.21	Software Engineering Ji í Mlejnek, Zden k Rybola Zden k Rybola Ji í Mlejnek (Gar.)	Z,ZK	5	14KP+2KC	L	PS
BIK-SP1.21	Team Software Project 1 Ji í Mlejnek Ji í Mlejnek Ji í Mlejnek (Gar.)	KZ	5	8KC		PS
BIK-SP2.21	Team Software Project 2 Ji í Mlejnek Ji í Mlejnek Ji í Mlejnek (Gar.)	KZ	5	4KC		PS
BIK-TJV.21	Java Technology Jií Dan ek Ond ej Guth Ond ej Guth (Gar.)	Z,ZK	5	14KP+4KC	Z	PS
BIK-IDO.21	Introduction to DevOps Ji í Mlejnek, Tomáš Vondra Tomáš Vondra Tomáš Vondra (Gar.)	Z,ZK	5	14KP+4KC	Z	PS

Characteristics of the courses of this group of Study Plan: Code=BIK-PS-SI.21 Name=Compulsory courses of specialization Software engineering, part-time study, version 2021

BIK-KOM.21	Conceptual Modelling	Z,ZK	5
	developing abstract thinking and precise formulation skills using conceptual models. Students learn skills of discerning key		-
	rrect relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological st		
	how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data repres		
learn the foundations of e	nterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEM	O method and the	BPMN notation
will be taught. The course	is designed with the respect to continuation in software implementations.		
BIK-OOP.21	Object-Oriented Programming	Z,ZK	5
Object-oriented program	ning has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate togeth	er by message pa	ssing. In this
course students get acqu	ainted with the main principles of object-oriented programming and design, used in modern programming languages. The er	nphasis is on pra	ctical techniques
for developing software, v	vhich includes testing, error handing, refactoring, and application of design pattern.		
BIK-PPA.21	Programming Paradigms	Z,ZK	5
The course deals with ba	sic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of par	ticular approache	s. Functional
programming paradigm a	nd its basic principles are explained in details. Logic programming is introduced as another way of declarative programming	. The principles a	re demonstrated
on lambda calculus and c	on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern main	stream programn	ning languages
such as C++ and Java.			
BIK-SWI.21	Software Engineering	Z,ZK	5
Students get acquainted	with methods of analysis and design of larger software projects that are typically designed and implemented in teams. The	consolidate and	practically verify
their knowledge during th	e analysis and design of larger software systems that will be developed in the concurrent course BIE-SP1. Students get han	ds-on experience	with CASE tools
using the visual language	UML for modeling and solving software problems. Students learn the basics of object-oriented analysis, architecture desig	n and testing. Wit	hin the course,
students also gain a theo	retical basis in the field of project management, estimation of costs of software projects, and methods of their development		
BIK-SP1.21	Team Software Project 1	KZ	5
	experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in th		
	ches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The tea		
project leader, regularly c	onsults with the team (at the seminars) both the formal and material aspects of the software design. The resulting software	artefact will be fu	rther developed
and finished in the BIE-S			
BIK-SP2.21	Team Software Project 2	KZ	5
This course is presented	in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BIK-TJV.21	Java Technology	Z,ZK	5
The aim of the course is t	o provide knowledge and skills needed for the development of smaller and larger information systems. Students will get ac	quainted with gen	eral theoretical
concepts and will be able	to apply these concepts using libraries and tools from the ecosystem of the Java programming language. After completing	the course stude	nts will be able
to participate in the devel	opment of software systems on the Java platform.		
BIK-IDO.21	ntroduction to DevOps	Z,ZK	5
The course deals with the	topic of DevOps and prepares future developers and administrators for a modern culture of development and operation of	systems and serv	ices. The course
covers the tools to suppo	rt software development, testing and compilation. It also focuses on tools for automating infrastructure management and bu	ilding and deploy	ing software to
the Cloud. It is an introdu	ction to technologies that will then be discussed in more detail in related follow-up courses. The student will also get acquai	nted with modern	technologies
used in practice.			
Name of the blo	ock: Compulsory elective courses		
iviinimai numbe	r of credits of the block: 5		

The role of the block: PV

Code of the group: BIK-PV-SI.21

Name of the group: Compulsory elective courses of the specialization Software engineering, part-time study, version 2021

Requirement credits in the group: In this group you have to gain at least 5 credits (at most 15) Requirement courses in the group: In this group you have to complete at least 1 course (at most 3) Credits in the group: 5

Note on the group: Guarantor: Ing. Michal Valenta, Ph.D., email: michal.valenta@fit.cvut.cz Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Scope Semester Code Completion Credits Role members) Tutors, authors and guarantors (gar.) **Economic Business Processes BIK-EPP.21** Z.ZK 5 14KP+4KC L ΡV David Buchtela David Buchtela Tomáš Evan (Gar.) **Financial Business Intelligence** BIK-FBI.21 Z,ZK 5 14KP+4KC Z,L ΡV David Buchtela David Buchtela Petra Pavlí ková (Gar.) Law and Informatics ΖK 14KP+8KC BIK-PAI.21 5 L ΡV Zden k Ku era Zden k Ku era Zden k Ku era (Gar.)

Characteristics of the courses of this group of Study Plan: Code=BIK-PV-SI.21 Name=Compulsory elective courses of the specialization Software engineering, part-time study, version 2021

 BIK-EPP.21
 Economic Business Processes
 Z,ZK
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 The aim of the course is to present typical processes related to the usual life cycle of a company. The course focuses mainly on the basic economic and financial aspects of business in the market environment of the Czech Republic and the basics of management. In the course, students are acquainted with the typical phases of the company's life cycle, from the establishment of the company, through the management of property and capital structure, financing of the company, determining the cost function of the company and its eventual rehabilitation or termination.
 Use of the company and its eventual rehabilitation or termination.
 Image: Company and the co

The aim of the course is to a and other indicators for com for financial management ar accounting periods, enables assess options related to fu information systems, decision BIK-PAI.21 La The aim of the course is to in Republic and will be alerted environment, will know their and open-source licenses.	nancial Business Intelligence acquaint students primarily with financial accounting as a tool for recording business op aparison with other companies and management decision process at the tactical and st ad prediction of business development. Management accounting allows monitoring of the s a multidimensional view of business data, enables to control effectively factors affectir ture business decisions. The principles of management accounting, described in this co on support systems, and other knowledge-oriented systems. w and Informatics introduce students into the basic legal instruments that they will encounter in their pract to the pitfalls that await them in business from the point of view of law. They will unders responsibilities in working with the Internet, will be familiar with the institutes of intellect Emphasis will also be put on the legal protection of data on the Internet, the registration behaviour in the field of IT that can be classified as criminal under the Czech law. The of the state of the legal protection of data on the Internet, the registration behaviour in the field of IT that can be classified as criminal under the Czech law. The of the state of the state	rategic level. The e financial status a ng the return on ir burse, are the bas tice. Students will stand the process tual property law, o finternet doma	second view and perform ivested capi sis of Busine gain knowle of concludi , and will be ins and prot	usiness ana v is manage ance of busi tal and to us ass Intelliger edge of doin ng contracts able to use tection again	ZK Image: Second Se	ng as a tool over several ation to business 5 he Czech ernet ense types e. Students
Name of the bloc	k: Povinná zkouška z angli tiny					
	of credits of the block: 2					
The role of the bl						
Code of the grou	p: BI-ZKA.21					
0	up: English Language Exam					
-	dits in the group: In this group you have to gain at I	east 2 cre	dits (at	most 4	4)	
Requirement cou	irses in the group: In this group you have to comple	ete 1 cours	se `			
Credits in the gro						
Note on the	BI-ANG, ending with an exam for two credits, is enrolled by s	tudents who	have co	mpletec	l preparato	r English
group:	courses and have a credit from the BI-A2L course. > > is enrolled by students who prepared for the exam independ students must complete a credit paper before their own exar be recognized for the course BI-ANGS (Independent prepara > The BIE-ECC course can be recognized for any active set is a the based by a student of a based by a s	ently and do n. After pass ation for the e semester a	o not hav sing the English after the	e credit exam, th exam) fo submiss	from BI-A2 ne student or 2 credits sion of a e>	L. These will also
	certificate at the level of at least B2 according to the Commo Name of the course / Name of the group of courses	n European	Framew	Vork of R	terence.	
Code	(in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BI-ANG1	English Language Examination without Preparatory Courses Kate ina Valentová Kate ina Valentová Kate ina Valentová (Gar.)	Z,ZK	2		L	PJ
BIE-EEC	English language external certificate Zden k Muziká Zden k Muziká Zden k Muziká (Gar.)	Z	4		L	PJ
BI-ANG	English Language, Internal Certificate Kate ina Valentová Kate ina Valentová Kate ina Valentová (Gar.)	ZK	2		Z,L	PJ
Characteristics of the	e courses of this group of Study Plan: Code=BI-ZKA.21 Name=I	English Lang	juage Ex	am		
	nglish Language Examination without Preparatory Courses			Z	Z,ZK	2
The BIE-ECC course can be	nglish language external certificate e recognized for any active semester after the submission of a certificate certificate that c	lemonstrates thei	r proficiency	in English o	Z comparable to c	4 or exceeding
	European Framework of Reference for Languages. nglish Language, Internal Certificate			1	ZK	2
	ching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?searc	h=BI-ANG				2
	ck: Elective courses of credits of the block: 0					
Code of the grou	p: BIK-SI-VO.21					- /

Name of the group: Elective Vocational Courses for a Bachelor Specialization BIK-SI.21, version 2021 Requirement credits in the group: Requirement courses in the group: Credits in the group: 0 Note on the group: Guarantor: Ing. Michal Valenta, Ph.D., email: michal.valenta@fit.cvut.cz

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
BIK-ADU.1	Unix Administration Petr Zemánek	Z,ZK	5	14KP+4KC	L	V
BIK-AWD.21	Web and Database Server Administration Lukáš Ba inka, Michal Valenta Lukáš Ba inka Michal Valenta (Gar.)	Z,ZK	5	14KP+4KC	Z	V
BIK-ASB.21	Applied Network Security Ji í Dostál Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	14KP+4KC	Z	V
BIK-APS.1	Architectures of Computer Systems Pavel Tvrdík	Z,ZK	5	14KP+4KC	Z	V
BIK-BEK	Secure Code Róbert Lórencz	Z,ZK	5	14KP+4KC	L	V
BIK-EHA.21	Ethical Hacking Ji í Dostál, Martín Kolárik, Tomáš Kiezler Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	14KP+4KC	L	V
BIK-HWB	Hardware Security Róbert Lórencz, Ji í Bu ek Ji í Bu ek Róbert Lórencz (Gar.)	Z,ZK	5	14KP+4KC	Z	V
BIK-IOT.21	Internet of Things Jan Jane ek Jan Jane ek Jan Jane ek (Gar.)	Z,ZK	5	14KP+4KC	Z	V
BIK-SIP.21	Network Programming Jan Fesl Jan Fesl (Gar.)	Z	5	14KP+4KC	Z	V
BIK-SPS.21	Administration of Computer Networks and Services Libor Dostálek, Jan Kubr Pavel Tvrdík Pavel Tvrdík (Gar.)	Z,ZK	5	14KP+4KC	Z	V
BIK-TAB.21	Applications of Security in Technology Ji í Dostál Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	14KP+4KC	L	V
BIK-TPS.21	Computer Networks Technologies Vladimír Smotlacha	Z,ZK	5	14KP+4KC	Z	V
BIK-UKB.21	Introduction to Cybersecurity František Ková, Tomáš Lu ák, Ivana Trummová František Ková František Ková (Gar.)	Z,ZK	5	21KP+2KC	; Z	V
BIK-VDC.21	Virtualization and Data Centers Jií Kašpar Jií Kašpar Jií Kašpar (Gar.)	Z,ZK	5	14KP+4KC	L	V
BIK-VPS.21	Selected Topics in Computer Networking Alexandru Moucha, Mohamed Bettaz Pavel Tvrdík Mohamed Bettaz (Gar.)	Z,ZK	5	14KP+4KC	L	V
BIK-ZSB.21	Basics of System Security Ji í Dostál, Simona Forn sek Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	14KP+4KC	Z	V

Characteristics of the courses of this group of Study Plan: Code=BIK-SI-VO.21 Name=Elective Vocational Courses for a Bachelor Specialization BIK-SI.21, version 2021

Students became familiar with the internal structure of Unix-like systems, with the administration of their basic subsystems and with the principles of their protection again	st unauthorized
use. In the seminars they will verify the information from the lectures on real life examples from practice. They will understand the differences between user and admini	istrator roles.
They gain theoretical and practical knowledge of tools for tracking, analyzing, debugging and securing systems, implementing and managing file systems, disk subsyste	ems, processes,
memory, network services, shared file systems, name services, remote access, and system boot.	
BIK-AWD.21 Web and Database Server Administration Z,ZK	5
Students will get acquainted with the administration of database and web servers and services. They will be able to install, configure, operate, test, and backup comple	ex database and
web service systems. The principles will be demonstrated on the PostgreSQL relational database engine and Apache will be used as an example of a web server.	
BIK-ASB.21 Applied Network Security Z,ZK	5
The aim of the course is to introduce selected topics from computer networks in terms of cybersecurity. These topics extend the basic knowledge gained in course BI-F	PSI with actual
security applications like the public key infrastructure, encrypted network protocols, link and network layer security or wireless networks. After finishing the course studies of the security of wireless networks and the security of wireless networks.	lent will get
knowledge of security applications in computer networks.	
BIK-APS.1 Architectures of Computer Systems Z,ZK	5
This course is presented in Czech.	
BIK-BEK Secure Code Z,ZK	5
The students will learn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting familiar with the	threat modeling
theory, students gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every program needs to	o run with
administrator privileges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing data and the relationships of securing data and the relation of the principles of the principle	•
security and database systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and the defense against the	em.
BIK-EHA.21 Ethical Hacking Z,ZK	5
The course gives a professional and academic introduction to computer and information security using the ethical hacking approach, which enables improved defence that	anks to adopting
an attacker mindset when discovering vulnerabilities, hands-on experience with different attacks, facilitates linking theory and practice in significant areas of one's digit	al literacy, and
can therefore be utilized by (future) security professionals, (informed) decision-makers, (savvy) users and developers alike.	
BIK-HWB Hardware Security Z,ZK	5
The course deals with hardware resources used to ensure security of computer systems including embedded ones. The students become familiar with the operating put	rinciples of
cryptographic modules, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vulnerabilities of	HW resources,
including side-channel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card technology includ	ling applications
and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of ciphers.	
BIK-IOT.21 Internet of Things Z,ZK	5
The course is focused on an overview of technologies and development tools used in the field of the Internet of Things (IoT). Lectures are devoted to an overview of se	
actuators, wireless communication technologies designed primarily for this area, and appropriate programming methods. They include an overview of IoT architectures	
application areas. Within the computer labs, students will gain practical experience with developing simple IoT systems using common development environments (har	rdware - ARM,
ESP, STM; software - Arduino, Raspberry Pi OS).	

BIK-SIP.21 Network Programming	Z	5			
BIK-SIP.21 Network Programming The course covers fundamental topics of programming network applications. It consists of 4 parts. The introductory part is focused on low-level prog	· – ·	-			
second part is devoted to designing communication protocols and their verification. The third part introductory part is locused of how-level prog					
introduces basic modern models of distributed computing - P2P and blockchain. All topics will be first explained theoretically and then practices in co	•	•			
programming language environment.		j a chosen			
	774	<u>г</u>			
BIK-SPS.21 Administration of Computer Networks and Services	Z,ZK	5			
The aim of the course is to deepen the theoretical knowledge of network technologies and protocols in the environment of network servers administre Linux and Windows. The course syllabus requires the knowledge at the level of courses BIE-PSI, BIE-VPS, and BIE-OSY. Practical skills will be gained	•				
with real network infrastructure.	i by practical hand	s-on experience			
	7 71	-			
BIK-TAB.21 Applications of Security in Technology	Z,ZK	5			
	The goal of the course is to introduce students to selected topics from cybersecurity technical applications that are utilized in different industries. Students get a broader overview of				
cybersecurity applications and extend their knowledge from the cryptology, the secure code, and system, network, and hardware security.					
BIK-TPS.21 Computer Networks Technologies	Z,ZK	5			
The course introduces students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic advanced technologies, components, and interfaces of contemporary computer networks at the physical students with basic advanced technologies, adva					
link layer. The lectures provide theoretical foundations of these technologies and explain relevant physical principles. In the labs, the respective techn	•				
with the most important ones students will get hands-on experience. Thematically, the course covers both local and long-range optical networks, Eth	ernet, modern wir	eless networks,			
always with focus on high-speed networks.					
BIK-UKB.21 Introduction to Cybersecurity	Z,ZK	5			
The goal of the course is to provide students with the introduction of basic concepts in modern approach to cybersecurity. Students will get a basic concepts in modern approach to cybersecurity.	verview of threats	in cyberspace			
and attacker techniques, security mechanisms in networks, operating systems and applications, as well as of basic cyberspace regulations.					
BIK-VDC.21 Virtualization and Data Centers	Z,ZK	5			
The aim of the course is to familiarize students with technology basis of cloud computer systems. It shows principles and techniques used in design a	and implementation	on of data center			
infrastructure, such as various kinds of virtualization and high availability of servers, storages, and software layers. The course guides through data of	center technologie	s from private			
to public and hybrid clouds. Student learn current trends in the architecture of IT infrastructure and its configuration for classic and cloud applications	 Students will un 	derstand the			
design, validation, and operation of complex infrastructures for modern applications with respect to scalability and protection against overloads, outa	iges, and data los	ses.			
BIK-VPS.21 Selected Topics in Computer Networking	Z,ZK	5			
The course builds upon the Computer Networks course (BI-PSI), obligatory for the program. Students will learn in detail principles, protocols, and techn	nologies used in m	odern computer			
networks from local area networks up to Internet, with focus on switching, routing, security, and virtualization. The emphasis will be on gaining practi	cal experience wit	th real network			
devices in the lab and learning important methods of local area and wide area networks from the viewpoint of functionality, performance, and securit	iy.				
BIK-ZSB.21 Basics of System Security	Z,ZK	5			
The goal of the course is to provide introduction to basic concepts in security of computer systems. Further, the course introduces the basics of fore	nsic analysis and	related topics			
such as malware analysis or incident response. After finishing the course student will get both theoretical and practical knowledge in the area of mod	dern operating sys	stems security,			
as well as skills needed for independent work in the area of operating system security incident analysis.					

Code of the group: BIK-V.21

Name of the group: Purely Elective Courses of Bachelor Programme, part-time Study, Version 2021 Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

Guarantor: prof. Ing. Róbert Lórencz, CSc., email: robert.lorencz@fit.cvut.cz

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
BIK-ADW.1	Windows Administration Miroslav Prágl	Z,ZK	4	14KP+2KC	Z	V
BIK-STO	Storage and Filesystems Ji í Kašpar	Z,ZK	4	13KP+4KC	L,Z	V
BIK-EJA	Enterprise Java Ji í Dan ek	KZ	4	13KP+4KC	Z	V
BIK-HMI	History of Mathematics and Informatics Alena Šolcová Alena Šolcová Alena Šolcová (Gar.)	ZK	3	13KP+2KC	; L	V
BIK-SQL.1	Language SQL Michal Valenta Michal Valenta Michal Valenta (Gar.)	KZ	4	13KP+4KC	; L	V
BIK-OOP	Object-Oriented Programming Filip K ikava Filip K ikava Filip K ikava (Gar.)	Z,ZK	4	14KP+4KC	Z	V
BIK-PJV	Programming in Java Jan Blizni enko Jan Blizni enko Jan Blizni enko (Gar.)	Z,ZK	4	13KP+4KC	Z	V
BIK-PRR.21	Project management David Pešek David Pešek Petra Pavlí ková (Gar.)	Z,ZK	5	14KP+4KC	Z	V
BIK-PKM	Introduction to Mathematics Karel Klouda Tomáš Kalvoda (Gar.)	Z	4		Z	V
BIK-TAB.21	Applications of Security in Technology Ji í Dostál Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	14KP+4KC	; L	V
TVV	Physical education	Z	0	0+2	Z,L	V
TV1	Physical Education	Z	0	0+2	Z	V
TVV0	Physical education	Z	0	0+2	Z,L	V
TV2K1	Physical Education 2	Z	1		L	V

BIK-TUR.21	User Interface Design Jan Schmidt Jan Schmidt (Gar.)	Z,ZK	5		L	V
BIK-KSA	Cultural and Social Anthropology Alena Libánská, Tomáš Houdek, Jakub Šenovský Jakub Šenovský Alena Libánská (Gar.)	ZK	2	13KP	L	V
BIK-ZWU	Introduction to Web and User Interfaces	Z,ZK	4	13KP+4KC	Z	V

Characteristics of the courses of this group of Study Plan: Code=BIK-V.21 Name=Purely Elective Courses of Bachelor Programme, part-time Study, Version 2021

part-time otday, v					
BIK-TAB.21	Applications of Security in Technology	Z,ZK	5		
The goal of the course i	s to introduce students to selected topics from cybersecurity technical applications that are utilized in different industries. St	udents get a broad	ler overview of		
cybersecurity applications and extend their knowledge from the cryptology, the secure code, and system, network, and hardware security.					
BIK-ADW.1	Windows Administration	Z,ZK	4		
This course is presented	d in Czech.				
BIK-STO	Storage and Filesystems	Z,ZK	4		
The student will learn pr	inciples and current solutions of storage systems architecture. The module explains principles of data store, protection, and a	archiving, as so as	storage scaling,		
load balancing and high	availability.				
BIK-EJA	Enterprise Java	KZ	4		
The course covers Java	technologies (Jakarta EE, Microprofile, etc.) which are used for the development of EIS (Enterprise Information Systems). T	hese applications f	ypically manage		
persistent data, are acc	essible to clients via the REST API and are created in the microservice architecture and deployed into orchestrated contain	ers.			
BIK-HMI	History of Mathematics and Informatics	ZK	3		
This course is presente	d in Czech.		1		
BIK-SQL.1	Language SQL	KZ	4		
Course is based on know	wiedge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language.	In particular stored	l program unites,		
triggers, recursive queri	es, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the p	oint of view of spec	ialized database		
structures like indexes,	clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plar	n and possibilities	of its. changes		
will be discussed. Lectu	res will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Or	acle DBMS and pa	artially on		
PostgreSQL.					
BIK-OOP	Object-Oriented Programming	Z,ZK	4		
This course is presented	I in Czech. Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs	of objects that coll	aborate together		
, , ,	this course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical te	chniques for softw	are development		
	nanding, refactoring and design patterns.				
BIK-PJV	Programming in Java	Z,ZK	4		
This course is presente	d in Czech. However, there is an English variant in the full-time program Informatics (B1801 / 4753).				
BIK-PRR.21	Project management	Z,ZK	5		
Project management no	t only as a common dictionary and setting necessary processes while preparing and / or managing projects, but also as a so	ocial art. 20 years o	of experience not		
only in IT in various pos	itions and different projects available at your hands.				
BIK-PKM	Introduction to Mathematics	Z	4		
This course is presente	d in Czech.				
TVV	Physical education	Z	0		
TV1	Physical Education	Z	0		
TVV0	Physical education	Z	0		
TV2K1	Physical Education 2	Z	1		
BIK-TUR.21	User Interface Design	Z,ZK	5		
Students gain a basic overview of methods for designing and testing common user interfaces. They get experience to solve the problems where software and other products do not					
communicate with the u	ser optimally, since the needs and characteristics of users are not taken into account during product development. Students	gain an overview	of methods that		
bring users into the dev	elopment process to ensure optimal interface for them.				
BIK-KSA	Cultural and Social Anthropology	ZK	2		
The one-semester cours	se aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the div	ersity of the world	- examples from		
anthropological research from our culture as well as from the "exotic" ones (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, health, history,					
death, etc). The course is an interesting alternative to other humanities, taught at FIT.					
BIK-ZWU	Introduction to Web and User Interfaces	Z,ZK	4		
This course is presented	d in Czech.				

List of courses of this pass:

Code	Name of the course	Completion	Credits	
BI-ANG	English Language, Internal Certificate	ZK	2	
	Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-ANG			
BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2	
BI-BAP.21	Bachelor Thesis	Z	14	
BIE-EEC	English language external certificate	Z	4	
The BIE-ECC course can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in English comparable to or exceeding				
the B2 level of the Common European Framework of Reference for Languages.				

BIK-AAG.21	Automata and Grammars	Z,ZK	5
	luced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite	-	-
and regular gramm	hars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages. Knowledge acquired the to creation of algorithms for pattern matching, data compression, translation, simple parsing, and creation of digital circuits	-	s applicable
BIK-ADU.1	Unix Administration	z,zk	5
	amiliar with the internal structure of Unix-like systems, with the administration of their basic subsystems and with the principles of their		1
	ars they will verify the information from the lectures on real life examples from practice. They will understand the differences between	0	
	al and practical knowledge of tools for tracking, analyzing, debugging and securing systems, implementing and managing file systems		
	memory, network services, shared file systems, name services, remote access, and system boot.		
BIK-ADW.1	Windows Administration	Z,ZK	4
	This course is presented in Czech.		1
BIK-AG1.21	Algorithms and Graphs 1	Z,ZK	5
The course is pr	resented in Czech. The course covers the basics from the efficient algorithm design, data structures, and graph theory, belonging to t	he core knowledge	e of every
	um. Students learn techniques of proofs of correctness of algorithms and techniques of asymptotic mathematics for estimation of their		
or average case (th	e course includes basics from probability theory needed for understanding randomized algorithms). Within exercises students learn ap	plications of studie	d algorithms
	for solving practical problems.	7 71/	
BIK-APS.1	Architectures of Computer Systems This course is presented in Czech.	Z,ZK	5
		7.71	5
BIK-ASB.21	Applied Network Security Irse is to introduce selected topics from computer networks in terms of cybersecurity. These topics extend the basic knowledge gaine	Z,ZK	-
	ions like the public key infrastructure, encrypted network protocols, link and network layer security or wireless networks. After finishin		
	knowledge of security applications in computer networks.	g	Jin thin got
BIK-AWD.21	Web and Database Server Administration	Z,ZK	5
	cquainted with the administration of database and web servers and services. They will be able to install, configure, operate, test, and		-
web serv	ice systems. The principles will be demonstrated on the PostgreSQL relational database engine and Apache will be used as an exan	nple of a web serve	er.
BIK-BEK	Secure Code	Z,ZK	5
The students will le	, arn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting fa	amiliar with the thre	eat modeling
-	gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every		
	ileges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing		
	database systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and the	le defense against	
BIK-BPR.21	Bachelor project	∣ ∠	1
-	g of the semester, the student reserves the topic of the bachelor's thesis and connects with the supervisor. He / she will arrange the semester to process the assignment. If he completes these tasks, the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the subject BI-BPR at the supervisor will award him a credit from the supervisor will award him a credit fro	-	
	enters the information on granting the credit using the form "Granting credit from the external supervisor of the final thesis" (http://fit.cvu		
	and signed form will be handed over by the student to the head of the Department of Defense, who will record the credit in KOS. 3. If the	-	-
			in that the
student has reserve	ved is formulated more generally, the tasks assigned to him by the supervisor for the semester should be aimed primarily at fine-tuning	•	
student has reserv	ved is formulated more generally, the tasks assigned to him by the supervisor for the semester should be aimed primarily at fine-tuni assignment can be supplemented and approved at the end of the semester.	•	
BIK-DBS.21	assignment can be supplemented and approved at the end of the semester. Database Systems	ng the assignment	so that the
BIK-DBS.21 Students get acqu	assignment can be supplemented and approved at the end of the semester. Database Systems ainted with the architecture of the database engine and typical user roles. They learn to design the structure of a smaller data store (ng the assignment Z,ZK including integrity	so that the 5 constraints)
BIK-DBS.21 Students get acqu using a conceptual	assignment can be supplemented and approved at the end of the semester. Database Systems ainted with the architecture of the database engine and typical user roles. They learn to design the structure of a smaller data store (model and then implement them in a relational database engine. They get acquainted with the SQL language and also with its theorem	ng the assignment Z,ZK including integrity itcal basis - relation	so that the 5 constraints) nal database
BIK-DBS.21 Students get acqu using a conceptual	assignment can be supplemented and approved at the end of the semester. Database Systems ainted with the architecture of the database engine and typical user roles. They learn to design the structure of a smaller data store (model and then implement them in a relational database engine. They get acquainted with the SQL language and also with its theoret acquainted with the principles of relational database schema normalization. They understand the basic concepts of transaction pro	ng the assignment Z,ZK including integrity tical basis - relation cessing and contro	so that the 5 constraints) nal database
BIK-DBS.21 Students get acqu using a conceptual model. They will ge	assignment can be supplemented and approved at the end of the semester. Database Systems ainted with the architecture of the database engine and typical user roles. They learn to design the structure of a smaller data store (model and then implement them in a relational database engine. They get acquainted with the SQL language and also with its theoret et acquainted with the principles of relational database schema normalization. They understand the basic concepts of transaction pro user access to a single data source. At the end of the course, students will be introduced to alternative nonrelational database normalization.	ng the assignment Z,ZK including integrity tical basis - relatior cessing and contro nodels.	so that the 5 constraints) hal database bl of parallel
BIK-DBS.21 Students get acqu using a conceptual model. They will ge BIK-DML.21	assignment can be supplemented and approved at the end of the semester. Database Systems ainted with the architecture of the database engine and typical user roles. They learn to design the structure of a smaller data store (model and then implement them in a relational database engine. They get acquainted with the SQL language and also with its theoret et acquainted with the principles of relational database schema normalization. They understand the basic concepts of transaction pro user access to a single data source. At the end of the course, students will be introduced to alternative nonrelational database in Discrete Mathematics and Logic	ng the assignment Z,ZK including integrity tical basis - relation cessing and contro- nodels. Z,ZK	so that the 5 constraints) nal database ol of parallel 5
BIK-DBS.21 Students get acqu using a conceptual model. They will ge BIK-DML.21 Students will get ac	assignment can be supplemented and approved at the end of the semester. Database Systems ainted with the architecture of the database engine and typical user roles. They learn to design the structure of a smaller data store (model and then implement them in a relational database engine. They get acquainted with the SQL language and also with its theoret et acquainted with the principles of relational database schema normalization. They understand the basic concepts of transaction pro user access to a single data source. At the end of the course, students will be introduced to alternative nonrelational database normalization.	ng the assignment Z,ZK including integrity tical basis - relatior cessing and contro- nodels. Z,ZK m set theory will b	so that the 5 constraints) hal database ol of parallel 5 e explained.
BIK-DBS.21 Students get acqu using a conceptual model. They will ge BIK-DML.21 Students will get ac	assignment can be supplemented and approved at the end of the semester. Database Systems ainted with the architecture of the database engine and typical user roles. They learn to design the structure of a smaller data store (model and then implement them in a relational database engine. They get acquainted with the SQL language and also with its theoret et acquainted with the principles of relational database schema normalization. They understand the basic concepts of transaction pro user access to a single data source. At the end of the course, students will be introduced to alternative nonrelational database n Discrete Mathematics and Logic cquainted with the basic concepts of propositional logic and predicate logic and learn to work with their laws. Necessary concepts fro	ng the assignment Z,ZK including integrity tical basis - relatior cessing and contro- nodels. Z,ZK m set theory will b	so that the 5 constraints) hal database ol of parallel 5 e explained.
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BIK-HWB	Hardware Security	Z,ZK	5
	•	· · ·	
	rdware resources used to ensure security of computer systems including embedded ones. The students become familiar wit		-
	security features of modern processors, and storage media protection through encryption. They will gain knowledge about vi		
-	ks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tec		applications
and re	lated topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of	ciphers.	
BIK-IDO.21	Introduction to DevOps	Z,ZK	5
1	pic of DevOps and prepares future developers and administrators for a modern culture of development and operation of sys		The course
	software development, testing and compilation. It also focuses on tools for automating infrastructure management and build		
	tion to technologies that will then be discussed in more detail in related follow-up courses. The student will also get acquaint		
			mologies
	used in practice.		
BIK-IOT.21	Internet of Things	Z,ZK	5
The course is focused on	an overview of technologies and development tools used in the field of the Internet of Things (IoT). Lectures are devoted to	an overview of sen	sors and
actuators, wireless commu	inication technologies designed primarily for this area, and appropriate programming methods. They include an overview of	IoT architectures for	r different
application areas. Within th	e computer labs, students will gain practical experience with developing simple IoT systems using common development en	vironments (hardwa	are - ARM,
	ESP, STM; software - Arduino, Raspberry Pi OS).		
BIK-KAB.21		Z,ZK	5
	Cryptography and Security	· · ·	
	the mathematical foundations of cryptography and gain an overview of current cryptographic algorithms. They will be able to		-
	ed on them and learn the basics of safe use of symmetric and asymmetric cryptographic systems and hash functions in appl		
will gain practical sk	ills in using standard cryptographic methods with an emphasis on security and will also get acquainted with the basic proce-	dures of cryptanaly	sis.
BIK-KOM.21	Conceptual Modelling	Z,ZK	5
	eveloping abstract thinking and precise formulation skills using conceptual models. Students learn skills of discerning key te	· · ·	-
	ect relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological struc		-
	w to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data represent	e e	
			-
	erprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEMO n		nn notation
	will be taught. The course is designed with the respect to continuation in software implementations.	·	
BIK-KSA	Cultural and Social Anthropology	ZK	2
The one-semester course a	ims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversit	y of the world - exa	mples from
anthropological research fro	m our culture as well as from the "exotic" ones (topics: kinship, religion, social exclusion, migration, globalization, , material cu	lture, language, hea	alth, history,
	death, etc). The course is an interesting alternative to other humanities, taught at FIT.		
BIK-LA1.21	Linear Algebra 1	Z,ZK	5
		· ·	
	to the basic concepts of linear algebra, such as vectors, matrices, vector spaces. We will define vector spaces over the field		
	e will present the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian elimination of the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian elimination of the concepts of the c		-
the connection with linear	manifolds. We define the regularity of matrices and learn to find their inversions using GEM. We will also learn to find eigenv	alues and eigenve	ctors of a
	matrix. We will also demonstrate some applications of these concepts in computer science.		
BIK-MA1.21	Mathematical Analysis 1	Z,ZK	5
	oducing students to the set of real numbers and its properties, and we note its differences with the set of machine numbers.	· · ·	-
	-	-	-
	ariable. We gradually introduce the notions of limits of sequences and functions, continuous functions, and derivatives of function		
	problems (iterative method of bisection and Newton's method), construction of cubic interpolation (spline), and formulation and		
	nding extrema of functions). The course is closed with the Landau's asymptotic notation and methods of mathematical descript	ion of complexity of	algorithms.
BIK-MA2.21	Mathematical Analysis 2	Z,ZK	6
The course completes the	theme of analysis of real functions of a real variable initiated in BIK-MA1 by introducing the Riemann integral. Students will le	earn how to integra	te by parts
and use the substitution met	hod. The next part of the course is devoted to number series, and Taylor polynomials and series. We apply Taylor's theorem to	the computation of	elementary
functions with a prescribed a	accuracy. Then we study the linear recurrence equations with constant coefficients, the complexity of recursive algorithms, an	d its analysis using	the Master
	duce the student to the theory of multivariate functions. After establishing basic concepts of partial derivative, gradient, and h		
•	tion of local extrema of multivariate functions as well as the numerical descent method. We conclude the course with the integ		
	enrolled only after successful completion of the course BIK-MA1, which can be replaced by the course BIK-ZMA in the case		
BIK-OOP	Object-Oriented Programming	Z,ZK	4
This course is presented in 0	Czech. Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs of ol	bjects that collabora	ate together
by message passing. In this	course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical techni	ques for software d	evelopment
	including testing, error handing, refactoring and design patterns.		
BIK-OOP.21	Object-Oriented Programming	Z,ZK	5
	ing has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together	· · ·	
			-
course students get acquair	ted with the main principles of object-oriented programming and design, used in modern programming languages. The emph	asis is on practical	recriniques
	for developing software, which includes testing, error handing, refactoring, and application of design pattern.	· · · · · ·	
BIK-OSY.21	Operating Systems	Z,ZK	5
In this course that is a follow	up of the Unix-like operating systems course students deepen their knowledge in areas of OS kernels, process and thread imp	entations, race	conditions,
critical regions, thread sche	duling, shared resource allocation and deadlocks, management of virtual memory and data storages, file systems, OS moni	toring. They are ab	e to desian
-	mplement simple multithreaded applications. General principles are illustrated on operating systems Solaris, Linux, or MS W		
			7
BIK-PA1.21	Programming and Algorithmics 1	Z,ZK	7
	formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, struc		-
statements, functions, cond	cept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searchi	ng, sorting, and ma	anipulating
	with linked lists.		
BIK-PA2.21	Programming and Algorithmics 2	Z,ZK	7
	nts of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, que		
	kills using the C++ programming language and are introduced to all C++ features needed in object-oriented programming (e	-	-
	copying/moving of objects, operator overloading, inheritance, polymorphism).		y,
		-	_
BIK-PAI.21	Law and Informatics	ZK	5
	introduce students into the basic legal instruments that they will encounter in their practice. Students will gain knowledge of	-	
Republic and will be aler	ted to the pitfalls that await them in business from the point of view of law. They will understand the process of concluding co	ontracts in real and	Internet
environment, will know their	responsibilities in working with the Internet, will be familiar with the institutes of intellectual property law, and will be able to	use commercial lic	ense types
	Emphasis will also be put on the legal protection of data on the Internet, the registration of Internet domains and protection a		
will also be alerted to su	ich behaviour in the field of IT that can be classified as criminal under the Czech law. The course will also include analyses of	of real cases from n	ractice.

BIK-PJV	Programming in Java	Z,ZK	4
BIK-PKM	This course is presented in Czech. However, there is an English variant in the full-time program Informatics (B1801 / 4753) Introduction to Mathematics	Z	4
	This course is presented in Czech.	2	-
BIK-PPA.21	Programming Paradigms	Z,ZK	5
	with basic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of partic digm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. The		
	s and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstr		
	such as C++ and Java.	7 71/	
BIK-PRR.21 Project manageme	Project management nt not only as a common dictionary and setting necessary processes while preparing and / or managing projects, but also as a social	Z,ZK art. 20 vears of ex	5 5 perience not
	only in IT in various positions and different projects available at your hands.		
BIK-PSI.21	Computer Networks	Z,ZK	5
	ces students to the principles of computer networking. It covers basic technologies, protocols, and services commonly used in local r is will be amended by proseminars that introduce students into network programming and demonstrate the abilities of advanced netw		
	actically verify configurations and management of network devices in the lab within the environment of the operating systems Linux a	-	
BIK-PST.21	Probability and Statistics	Z,ZK	5
	the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variables. T om variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction		
	nown distributional parameters from random sample characteristics. They will also be introduced to the methods for testing statistical		
	the statistical dependence of two or more random variables.	7 74	5
BIK-SAP.21 Students will get	Computer Structure and Architecture acquainted with the basic architecture and units of a digital computer, understand the structure, function, and implementation of arith	Z,ZK metic-logic unit, c	-
memory, I/O comm	unication, methods of data transfers between the units. The logic design and the implementation of a program-controlled simple process	ssor is practically in	mplemented
BIK-SIP.21	in the labs using programmable circuits (FPGA), a single-chip microcomputer, and modern design (EDA) tools.	7	5
	Network Programming fundamental topics of programming network applications. It consists of 4 parts. The introductory part is focused on low-level program	—	-
	ted to designing communication protocols and their verification. The third part introduces the principles and applications of middlewa		
introduces basic	modern models of distributed computing - P2P and blockchain. All topics will be first explained theoretically and then practices in comprogramming language environment.	mputer labs using	a chosen
BIK-SP1.21	Team Software Project 1	KZ	5
-	ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the		
-	nat teaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The teach Ilarly consults with the team (at the seminars) both the formal and material aspects of the software design. The resulting software art		
	and finished in the BIE-SP2 course.		
BIK-SP2.21	Team Software Project 2 This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	KZ	5
BIK-SPS.21	Administration of Computer Networks and Services	Z,ZK	5
The aim of the cou	rse is to deepen the theoretical knowledge of network technologies and protocols in the environment of network servers administrate	d under the operat	0,
Linux and Windows	. The course syllabus requires the knowledge at the level of courses BIE-PSI, BIE-VPS, and BIE-OSY. Practical skills will be gained by with real network infrastructure.	practical hands-or	n experience
BIK-SQL.1	Language SQL	KZ	4
	knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In particular states of SQL language is a state of the state o		
	queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point of exes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan ar	-	
	d. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS.	•	•
BIK-STO	PostgreSQL. Storage and Filesystems	Z,ZK	4
	rn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and archi		
	load balancing and high availability.		
BIK-SWI.21 Students get acqua	Software Engineering ainted with methods of analysis and design of larger software projects that are typically designed and implemented in teams. They co	Z,ZK	5 5
	ring the analysis and design of larger software systems that will be developed in the concurrent course BIE-SP1. Students get hands-		
-	nguage UML for modeling and solving software problems. Students learn the basics of object-oriented analysis, architecture design a udents also gain a theoretical basis in the field of project management, estimation of costs of software projects, and methods of their	-	the course,
BIK-TAB.21	Applications of Security in Technology	Z,ZK	5
	urse is to introduce students to selected topics from cybersecurity technical applications that are utilized in different industries. Stude	nts get a broader	1
	cybersecurity applications and extend their knowledge from the cryptology, the secure code, and system, network, and hardware	-	2
BIK-TDP.21 The course is focus	Documentation and Presentation eed on the basics of creating electronic documentation with emphasis on the creation of technical reports of a larger scope, typically fi	KZ nal university thes	3 es. Students
	of a technical report in the LaTeX system, process an electronic presentation using the LaTeX Beamer system, and practically prese		
the teacher. The	course is intended primarily for those students who have chosen the topic of their bachelor's thesis or will choose it within the first 14 exercises of the course, an active approach to the creation of individual parts of the bachelor's thesis is assumed.	days of teaching.	Within the
BIK-TJV.21	Java Technology	Z,ZK	5
The aim of the cou	rse is to provide knowledge and skills needed for the development of smaller and larger information systems. Students will get acqua	ainted with genera	
concepts and will	be able to apply these concepts using libraries and tools from the ecosystem of the Java programming language. After completing the to participate in the development of software systems on the Java platform.	e course students	will be able
BIK-TPS.21	Computer Networks Technologies	Z,ZK	5
	uces students with basic and advanced technologies, components, and interfaces of contemporary computer networks at the physical provide theoretical foundations of these technologies, and evaluate physical principles. In the labe, the respective technologies	-	-
-	res provide theoretical foundations of these technologies and explain relevant physical principles. In the labs, the respective technolo rtant ones students will get hands-on experience. Thematically, the course covers both local and long-range optical networks, Ethern	-	
	always with focus on high-speed networks.		

Bit Control Contro Control Control	BIK-TUR.21	User Interface Design	Z.ZK	5	
communicate with the user optimally, since the needs and characteristics of users are not taken into account during product development. Students gain an overview of methods that bring users into the development process to ensure optimal interface for them. BIK-TZP.21 Technological Fundamentals of Computers Z,ZK 5 Students get acquainted with the fundamentals of digital and analog circuits, as well as basic methods of analyzing them. Students learn how computer structures look like at the lowest level. They are introduced to the function of a transistor. They will understand why processors generate heat, why coing is necessary, and how to reduce the consumption, what the limits to the maximum operating frequency are and how to raise them; why a computer bus needs to be terminated, what happens if it is not; how a computer power supply looks like (in principle). In the labs, students model the behavior of basic electrical circuits in SW Mattematica. Z,ZK 5 BIK-UKB.21 Introduction of basic concepts in modern approach to cybersecurity. Students will get a basic overview of threats in cyberspace and atacker techniques, security mechanisms in networks, operating systems for computers at flick users. The most popular OS today, Android, has a unix kernel. Students get overview of basic properties of this OS family, such as processes and threads, access rights and user identity, filters, or handling files in a flie system. They learn to use practically these systems at the level of advanced users who are not only able to ullize powerful system for course is to familiarize students with technology basis of cloud computer systems for calses in cyberspace regulation. 5 BIK-VDC.21 Virtualizzition and Data Centers Z,ZK	1	5	,	-	
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TV1Physical EducationZ0TV2K1Physical Education 2Z1TVVPhysical educationZ0	BIK-ZWU	Introduction to Web and User Interfaces	Z,ZK	4	
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TVVPhysical educationZ0	TV1	Physical Education	Z	0	
	TV2K1	Physical Education 2	Z	1	
TVV0 Physical education Z 0	TVV	Physical education	Z	0	
	TVV0	Physical education	Z	0	

For updated information see <u>http://bilakniha.cvut.cz/en/FF.html</u> Generated: day 2024-05-19, time 10:49.