Doporu ený pr chod studijním plánem

Název pr chodu: Bachelor specialization, Software Engineering, 2021

Fakulta: Fakulta informa ních technologií

Katedra:

Pr chod studijním plánem: Bachelor Specialization, Software Engineering, 2021

Obor studia, garantovaný katedrou: Úvodní stránka

Garant oboru studia:

Program studia: Informatics Typ studia: Bakalá ské prezen ní

Poznámka k pr chodu: In addition to purely elective courses, compulsory courses in neighboring specializations can also be enrolled here as electives. 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.

Kódování rolí p edm t a skupin p edm t :

P-povinné p edm ty programu, PO-povinné p edm ty oboru, Z-povinné p edm ty, S-povinn volitelné p edm ty, PV-povinn volitelné p edm ty, F-volitelné p edm ty odborné, V-volitelné p edm ty, T-t lovýchovné p edm ty

Kódování zp sob zakon ení predm t (KZ/Z/ZK) a zkratek semestr (Z/L):

KZ - klasifikovaný zápo et, Z - zápo et, ZK - zkouška, L - letní semestr, Z - zimní semestr

íslo semestru: 1

Kód	Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.)	Zakon ení	Kredity	Rozsah	Semestr	Role
BIE-DML.21	Discrete Mathematics and Logic Eva Pernecká, Jitka Rybní ková, Francesco Dolce Eva Pernecká Eva Pernecká (Gar.)	Z,ZK	5	2P+1R+1C	Z	PP
BIE-LA1.21	Linear Algebra 1 Marzieh Forough Karel Klouda Marzieh Forough (Gar.)	Z,ZK	5	2P+1R+1C	Z	PP
BIE-PA1.21	Programming and Algorithmics 1 Jan Trávní ek, Ladislav Vagner, Radek Hušek, Josef Vogel Jan Trávní ek Jan Trávní ek (Gar.)	Z,ZK	7	2P+2R+2C	Z	PP
BIE-GIT.21	SW Development Technologies Petr Pulc Petr Pulc (Gar.)	Z	3	2P	Z	PP
BIE-TZP.21	Technological Fundamentals of Computers Martin Novotný, Kate ina Hyniová, Matúš Olekšák Martin Novotný Martin Novotný (Gar.)	Z,ZK	5	2P+2C	Z	PP
BIE-UOS.21	Unix-like Operating Systems Jan Trdli ka, Zden k Muziká, Jakub Žitný Zden k Muziká Zden k Muziká (Gar.)	KZ	5	2P+2C	Z	PP

íslo semestru: 2

Kód	Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.)	Zakon ení	Kredity	Rozsah	Semestr	Role
BIE-PSI.21	Computer Networks Yelena Trofimova, Michal Polák Yelena Trofimova Yelena Trofimova (Gar.)	Z,ZK	5	2P+1R+1C	L	PP
BIE-SAP.21	Computer Structures and Architectures Petr Fišer, Hana Kubátová Petr Fišer Petr Fišer (Gar.)	Z,ZK	5	2P+1R+2C	L	PP
BIE-DBS.21	Database Systems Josef Pavlí ek, Otto Šleger, Martin Urbanec Josef Pavlí ek Josef Pavlí ek (Gar.)	Z,ZK	5	2P+2R+1L	L	PP
BIE-MA1.21	Mathematical Analysis 1 Antonella Marchesiello Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	5	2P+1R+1C	L	PP
BIE-PA2.21	Programming and Algorithmics 2 Jan Trávní ek, Ladislav Vagner, Radek Hušek, Josef Vogel Jan Trávní ek Jan Trávní ek (Gar.)	Z,ZK	7	2P+1R+2C	L	PP
		Min. p edm.				
BIE-V.2021	Purely Elective Bachelor Courses, Version 2021 till 2024/25	0	Min/Max			
	BIE-ZUM,BIE-ZRS, (pokra ování viz seznam skupin níže)	Max. p edm.	0/55			V
		15				

íslo semestru: 3

Kód	Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.)	Zakon ení	Kredity	Rozsah	Semestr	Role
BIE-AG1.21	Algorithms and Graphs 1 Radek Hušek, Tomáš Valla, Ond ej Suchý, Michal Opler, Dušan Knop, Jan Volec Dušan Knop Dušan Knop (Gar.)	Z,ZK	5	2P+2C	Z	PP
BIE-AAG.21	Automata and Grammars Jan Holub Jan Holub (Gar.)	Z,ZK	5	2P+2C	Z	PP
BIE-MA2.21	Mathematical Analysis 2 Antonella Marchesiello Tomáš Kalvoda Antonella Marchesiello (Gar.)	Z,ZK	6	3P+2C	Z	PP
BIE-IDO.21	Introduction to DevOps Zden k Rybola, Tomáš Vondra, Jakub Jab rek Tomáš Vondra Zden k Rybola (Gar.)	Z,ZK	5	2P+2C	Z	PS
BIE-TJV.21	Java Technology Ond ej Rozinek Ond ej Rozinek (Gar.)	Z,ZK	5	2P+2C	Z	PS
BIE-PPA.21	Programming Paradigms Jan Janoušek, Tomáš Jakl, Petr Máj, Jan Liam Verter Jan Janoušek Jan Janoušek (Gar.)	Z,ZK	5	2P+2R	Z	PS

íslo semestru: 4

Kód	Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.)	Zakon ení	Kredity	Rozsah	Semestr	Role
BIE-KAB.21	Cryptography and Security František Ková, Ivana Trummová, Róbert Lórencz, Ji í Bu ek, Josef Kokeš, Martin Jure ek, Jaroslav K íž, David Pokorný, Filip Kodýtek Ji í Bu ek Róbert Lórencz (Gar.)	Z,ZK	5	2P+2C	L	PP
BIE-OSY.21	Operating Systems Jan Trdli ka, Pavel Tvrdík, Michal Štepanovský Pavel Tvrdík Pavel Tvrdík (Gar.)	Z,ZK	5	2P+1R+1L	L	PP
BIE-SWI.21	Software Engineering Zden k Rybola, Jakub Jab rek, Ond ej Rozinek, Stanislav Kuznetsov Zden k Rybola Zden k Rybola (Gar.)	Z,ZK	5	2P+1C	L	PS
BIE-SP1.21	Team Software Project 1 Zden k Rybola, Jakub Jab rek, Ond ej Rozinek, Stanislav Kuznetsov Zden k Rybola Zden k Rybola (Gar.)	KZ	5	4C	L	PS
BIE-PV-SI.21	Compulsory elective Courses of the Specialization Software Engineering, version 2021 BIE-EPP21,BIE-PAI.21	Min. p edm. 1 Max. p edm. 3	Min/Max 5/15			PV
BIE-V.2021	Purely Elective Bachelor Courses, Version 2021 till 2024/25 BIE-ZUM, BIE-ZRS, (pokra ování viz seznam skupin níže)	Min. p edm. 0 Max. p edm. 15	Min/Max 0/55			V

íslo semestru: 5

Kód	Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.)		Kredity	Rozsah	Semestr	Role
BIE-BPR.21	Bachelor Project Zden k Muziká Zden k Muziká (Gar.)	Z	1		Z,L	PP
BIE-PST.21	Probability and Statistics Francesco Dolce Pavel Hrabák Francesco Dolce (Gar.)	Z,ZK	5	2P+2C	Z	PP
BIE-KOM.21	Conceptual Modelling Robert Pergl, Marek B Iohoubek Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	2P+2C	Z	PS
BIE-OOP.21	Object-Oriented Programming Petr Máj, Filip K ikava, Filip íha Filip K ikava Filip K ikava (Gar.)	Z,ZK	5	2P+2C	Z	PS
BIE-SP2.21	Team Software Project 2 Zden k Rybola, Jakub Jab rek, Ond ej Rozinek, Stanislav Kuznetsov, Michal Valenta, Adéla Svítková Stanislav Kuznetsov Zden k Rybola (Gar.)	KZ	5	2C	Z	PS
BIE-V.2021	Purely Elective Bachelor Courses, Version 2021 till 2024/25 BIE-ZUM,BIE-ZRS, (pokra ování viz seznam skupin níže)	Min. p edm. 0 Max. p edm.	Min/Max 0/55			V
		15				

íslo semestru: 6

Kód	Název p edm tu / Název skupiny p edm t (u skupiny p edm t seznam kód jejích len) Vyu ující, auto i a garanti (gar.)	Zakon ení	Kredity	Rozsah	Semestr	Role
BIE-BAP.21	Bachelor Thesis Zden k Muziká Zden k Muziká Zden k Muziká (Gar.)	Z	14		L,Z	PP
BIE-TDP.21	Documentation and Presentation Dana Vynikarová Dana Vynikarová (Gar.)	KZ	3	2P+2C	Z,L	PP
BIE-EEC	English language external certificate Zden k Muziká Zden k Muziká Zden k Muziká (Gar.)	Z	4	2D	L	PP
	Purely Elective Bachelor Courses, Version 2021 till 2024/25 BIE-ZUM,BIE-ZRS, (pokra ování viz seznam skupin níže)	Min. p edm.				
DIE 1/2024		0	Min/Max			.,
BIE-V.2021		Max. p edm.	0/55			V
		15				

Seznam skupin p edm t tohoto pr chodu s úplným obsahem len jednotlivých skupin

Kód		Název skupiny p ed (specifikace v	lm t a kódy viz zde nebo n	len této skupiny p edm t íže seznam p edm t)	Zak	on ení	Kredity	Rozsah	Semestr	Role
BIE-PV	′-SI.21		re Courses of ngineering, ve	the Specialization Software rsion 2021		p edm. 1 p edm. 3	Min/Ma	•		PV
BIE-EPP.21	Economic	Business Processes	BIE-PAI.21	Law and Informatics					l l	
BIE-V	2021	Purely Elective Ba	chelor Course	s, Version 2021 till 2024/25		p edm. 0 . p edm.	Min/Ma	(v
						15				
BIE-ZUM	Artificial In	telligence Fundamen	BIE-ZRS	Basics of System Control		BIE-CCN	i C	Compiler Construction		
BIE-SCE1		Engineering Seminar I	BIE-SCE2	Computer Engineering Seminar II		BIE-CZ0	С	zech Langua	ge for Foreign	ers
BIE-CZ1.21	Czech Lan	guage for Foreigners II	UKCJP	eština pro pokro ilé		BIE-DIF		ifferential equ	uations	
BIE-EPR	Economic	' '	BIE-FTR.1	Financial Markets		BIE-HAS			s in Cryptogra	
BIE-CSI		n to Computer Science	BIE-EHD	Introduction to European Economi		FITE-EH			European Eco	onomi
BIE-IMA	Introductio	n to Mathematics	BIE-IMA2	Introduction to Mathematics 2		BIE-ST1		etwork Techr	ology 1	
BIE-PKM		y Mathematics	BIE-PJV	Programming in Java		BIE-PS2		rogramming		
FIT-ACM1		vací praktika 1	FIT-ACM2	Programovací praktika 2		FIT-ACM		rogramovací	<u>'</u>	
FIT-ACM4		vací praktika 4	FIT-ACM5	Programovací praktika 5		FIT-ACM		rogramovací	•	
BIE-PRR.21		nagement	BIE-SKJ.21	Scripting Languages		BIE-VAK			binatorics App	licati
BIE-VMM		Mathematical Methods	BI-SCE1	Seminá po íta ového inženýrství		BIE-SEG		ystems Engii		
TVV	T lesná vý		TVV0	T lesná výchova 0		TV2K1		lesná výcho		
TVKLV	T lovýchov	ný kurz	BIE-TUR.21	User Interface Design		BIE-VR1	.21 V	Virtual reality I		
BIE-ADW.1	Windows A	Administration	FITE-SEP	World Economy and Business		BIE-SEP	V	World Economy and Business		
BIE-3DT.1	3D Printing	9		·						

Seznam p edm t tohoto pr chodu:

Kód	Název p edm tu	Zakon ení	Kredity				
BI-SCE1	Seminá po íta ového inženýrství I	Z	4				
Seminá po íta ového inženýrství je výb rový p edm t pro studenty, kte í se cht jí zabývat hloub ji tématy íslicového návrhu, spolehlivosti a odolnosti pro							
student m se v rár	nci p edm tu p istupuje individuáln a každý student i skupinka student eší n jaké zajímavé aktuální téma s vybraným školitelem	. Sou ástí p edm	tu je práce s				
v deckými lánky a	ı jinou odbornou literaturou a/nebo práce v laborato ích K N. Kapacita p edm tu je omezena možnostmi u itel seminá e. Probíraná	témata jsou pro ka	ždý semestr				
	nová.						
BIE-3DT.1	3D Printing	KZ	4				
Students learn to	lesign three-dimensional objects optimized for printing on a RepRap printer and the printing itself. They will be able to design objects	, prepare for printi	ng and print				
	in 3D.						
BIE-AAG.21	Automata and Grammars	Z,ZK	5				
Students are introduced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite automata, regular expressions							
and regular gramm	ars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, relationships between fo	rmal languages an	id automata.				
Knowledge acqui	red through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation	and design of digi	tal circuits				

BIE-ADW.1 Windows Administration	Z,ZK	4
Students understand the architecture and internals of the Windows OS and acquire the skills to administrate the Windows OS. They are able use the	standard administra	ition and
security tools and apply advanced ActiveDirectory administration methods. They are able to solve problems by applying appropriate troubleshootin	g methods and admi	nistrate
heterogeneous systems. Students are able to effectively configure centralised administration of a computer network.		
BIE-AG1.21 Algorithms and Graphs 1	Z,ZK	5
The course covers the basics from the efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computable the consumption of the core knowledge of every computable the consumption of the core knowledge of every computation of the core knowledge of the core knowled	_	
with the concurrent BIE-AAG and BIE-ZDM courses in which the students gain the basic skills and knowledge needed for time and space complexity o practically the asymptotic mathematics.	algorithms and lean	1 to nandle
BIE-BAP.21 Bachelor Thesis	Z	14
	7	1
BIE-BPR.21 Bachelor Project At the beginning of the semester the student will contact the supervisor of the bachelor thesis he has booked. They will discuss the partial tasks that it		
semester. If he fulfill these tasks, the supervisor will award him / her at the end of the semester with the BI-BPR course		adming the
BIE-CCN Compiler Construction	Z,ZK	5
This is an introductory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principle	1 ' 1	
understand the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarchin	•	
BIE-CSI Introduction to Computer Science	Z	2
This is an introductory class on Elementary Computer Science for broad audiences: bachelor students in computer science, students majoring in other	ields but interested i	n computer
science, high-school students, anybody with a background in basic math and the desire to understand the absolute basics of computer science. The	oal of the class is to	introduce
and relate basic principles of computer science for students to understand, early on, what computer science is, why things such as high-level program		
done the way they are, and even how, on a basic yet representative and practically relevant level. After taking the class, students are able to answer n		
questions but also questions about themselves such as which courses to take next and which books to follow up with, ideally realizing if they are interested, or even less than before	sted in computer sci	ence more
than expected, or even less than before.	V7	
BIE-CZ0 Czech Language for Foreigners Course Czech for foreigners offers the basic topics of conversation: Introductions, Orientation, Shopping, Work / Study, Travel, Tin	KZ	2
	KZ	2
BIE-CZ1.21 Czech Language for Foreigners II The course is intended for Students of English programmes who have completed BIE-CZ0 course or have basic knowledge of the Czech language. T	1	
basic vocabulary and clarifies the structure of the Czech language structure with regard to the practical needs of Students residing in the		Janas tric
BIE-DBS.21 Database Systems	Z,ZK	5
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	1 ' 1	
using a conceptual model and then implement them in a relational database engine. They get acquainted with the SQL language and also with its theore		
model. They will get acquainted with the principles of relational database schema normalization. They understand the basic concepts of transaction pr		
user access to a single data source. At the end of the course, students will be introduced to alternative nonrelational database	models.	
BIE-DIF Differential equations	Z,ZK	5
This course provides a foundational overview of differential equations, starting with basic motivation and examples of ODEs and progressing to essential	solution methods like	separation
of variables. Key theorems on existence and uniqueness establish when solutions can be guaranteed. Linear and system-based ODEs are covered we		
polynomial analysis, followed by examples of non-linear models such as predator-prey and epidemiological models to showcase real-world application	· ·	
partial differential equations (PDEs) extends these concepts to multi-variable contexts. The course will also cover numerical methods for solving ODE	s and PDEs, includir	ig implicit
and explicit Euler methods, Runge-Kutta methods, and finite element methods for both ODEs and PDEs.	7 71/	_
BIE-DML.21 Discrete Mathematics and Logic Students will get acquainted with the basic concepts of propositional logic and predicate logic and learn to work with their laws. Necessary concepts fr	Z,ZK	5 evolained
Special attention is paid to relations, their general properties, and their types, especially functional relations, equivalences, and partial orders. The cou	=	· .
combinatorics and number theory, with emphasis on modular arithmetics.	oo aloo layo aomii iii	5 245.55 5.
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 Eng	1	
the B2 level of the Common European Framework of Reference for Languages.		-
BIE-EHD Introduction to European Economic History	Z,ZK	3
The course introduces a selection of themes from European economic history. It gives the student basic knowledge about forming of the global economic	y through the descri	otion of the
key historical periods. As European countries have been dominant actors in this process it focuses predominantly on their roles in economic history. Fi	om the large econor	nic area of
the Roman Empire to the fragmentation of the Middle Ages, from the destruction of WWII to the current affairs, the development of modern financial	•	
course does not cover the detailed economic history of particular European countries but rather the impact of trade and the role of particular events, in	nstitutions and organ	izations in
history. Class meetings will consist of a mixture of lectures and discussions.	771	
BIE-EPP.21 Economic Business Processes	Z,ZK	5
· ·		
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 ar	-	
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 ar 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	
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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 are 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 establishment of the company, through the management of property and capital structure, financing of the company, determining the cost function of the evaluating the financial health of the company and its eventual rehabilitation or termination. BIE-EPR Economic project This course is an extension of the course Introduction to European Economic History (BIE-EHD). BIE-FTR.1 Financial Markets Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view of the course is an extension of the course is an eventual rehabilitation or termination.	z company's life cycle ne company and labo Z Z,ZK n the issue of credit es, many firms need	1 5 risk, and graduates
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 are 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 establishment of the company, through the management of property and capital structure, financing of the company, determining the cost function of the evaluating the financial health of the company and its eventual rehabilitation or termination. BIE-EPR Economic project This course is an extension of the course Introduction to European Economic History (BIE-EHD). BIE-FTR.1 Financial Markets Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view of plobalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities from technical schools who have sufficient knowledge ICT and mathematics, and who have at the same time an understanding of the functioning of financial markets course thus englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistics.	z company's life cycle ne company and labor Z Z,ZK n the issue of credit es, many firms need nancial markets. The	1 5 risk, and graduates Financial
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 are 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 establishment of the company, through the management of property and capital structure, financing of the company, determining the cost function of the evaluating the financial health of the company and its eventual rehabilitation or termination. BIE-EPR Economic project This course is an extension of the course Introduction to European Economic History (BIE-EHD). Financial Markets Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view of globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities from technical schools who have sufficient knowledge ICT and mathematics, and who have at the same time an understanding of the functioning of financial markets course thus englobes both a description of financial markets and related economic theories, and an overview of mathematical and statist BIE-GIT.21 SW Development Technologies	z company's life cycle ne company and laborate and a company and laborate and a company and laborate and a company firms need nancial markets. The ical tools used in this	1 5 risk, and graduates Financial field.
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	Introduction to DevOps	Z,ZK	5
COVERS the tools to	ith the topic of DevOps and prepares future developers and administrators for a modern culture of development and operation of syst		
	support software development, testing and compilation. It also focuses on tools for automating infrastructure management and buildi introduction to technologies that will then be discussed in more detail in related follow-up courses. The student will also get acquaint		
	used in practice.		
BIE-IMA	Introduction to Mathematics	Z	4
Students refresh ar	d extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a examples.	ble to apply them	in particular
BIE-IMA2	Introduction to Mathematics 2	Z	2
Students refresh ar	d extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a examples.	ble to apply them	in particular
BIE-KAB.21	Cryptography and Security	Z,ZK	5
	erstand the mathematical foundations of cryptography and gain an overview of current cryptographic algorithms. They will be able to		
	ms based on them and learn the basics of safe use of symmetric and asymmetric cryptographic systems and hash functions in appl		-
will gain practical:	skills in using standard cryptographic methods with an emphasis on security and will also get acquainted with the basic procedures of	f cryptanalysis. St	udents are
	expected to be competent programmers in C/C++ (on a small scale). Basic Python knowledge is an advantage.		
BIE-KOM.21	Conceptual Modelling	Z,ZK	5
The course is focu	sed on developing abstract thinking and precise formulation skills using conceptual models. Students learn skills of discerning key te	ms in a domain, t	ne ability to
categorize and spec	ify correct relations in complex systems of social reality, mostly enterprises and institutions. Students learn basics of ontological struct	ural modeling in th	e OntoUML
notation. Next, they	learn how to express business rules and constraints using the OCL language and foundations of OWL/RDF semantic data represent	ation in the Interne	t. They also
earn the foundation	s of enterprise engineering, being a discipline for conceptual modelling of enterprises and institutes and their processes. The DEMO m	ethod and the BP	MN notation
	will be taught. The course is designed with the respect to continuation in software implementations.		
BIE-LA1.21	Linear Algebra 1	Z,ZK	5
	tudents to the basic concepts of linear algebra, such as vectors, matrices, vector spaces. We will define vector spaces over the field	-	
	fields. We will present the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian eliminates and the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian eliminates and the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian eliminates and the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian eliminates and the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian eliminates and the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian eliminates and the concepts of basis and dimension and learn to solve systems of linear equations using the Gaussian eliminates and the concepts of the	•	,
the connection wi	th 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.		
BIE-MA1.21	Mathematical Analysis 1	Z,ZK	5
_	e by introducing students to the set of real numbers and its properties, and we note its differences with the set of machine numbers.	-	15
	a real variable. We gradually introduce the notions of limits of sequences and functions, continuous functions, and derivatives of functions are sequenced as a sequence of the control of		
	ot-finding problems (iterative method of bisection and Newtons method), construction of cubic interpolation (spline), and formulation and		-
	sue of finding extrema of functions). The course is closed with the Landaus asymptotic notation and methods of mathematical descriptions.		
BIE-MA2.21	Mathematical Analysis 2	Z,ZK	6
-	tes the theme of analysis of real functions of a real variable initiated in BIE-MA1 by introducing the Riemann integral. Students will le	=	
	tion method.The next part of the course is devoted to number series, and Taylor polynomials and series. We apply Taylors theorem to a scribed accuracy. Then we study the linear recurrence equations with constant coefficients, the complexity of recursive algorithms, an	•	
· · · · · · · · · · · · · · · · · · ·	we introduce the student to the theory of multivariate functions. After establishing basic concepts of partial derivative, gradient, and F	-	
	localization of local extrema of multivariate functions as well as the numerical descent method. We conclude the course with the integr		=
BIE-OOP.21	Object-Oriented Programming	Z,ZK	5
	ogramming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together	,	_
	acquainted with the main principles of object-oriented programming and design, used in modern programming languages. The emph		_
· ·	for developing software, which includes testing, error handing, refactoring, and application of design pattern.	·	
BIE-OSY.21	Operating Systems	Z,ZK	5
	a follow-up of the Unix-like operating systems course students deepen their knowledge in areas of OS kernels, process and thread imp		conditions,
critical regions, thre	ad scheduling, shared resource allocation and deadlocks, management of virtual memory and data storages, file systems, OS monit	oring. They are ab	le to design
	and implement simple multithreaded applications. General principles are illustrated on operating systems Solaris, Linux, or MS W		
		ndows.	
BIE-PA1.21	Programming and Algorithmics 1	ndows. Z,ZK	7
	Programming and Algorithmics 1 construct algorithms for solving basic problems and write them in the C language. They master data types (simple, pointers, structure	Z,ZK	
Students learn to		Z,ZK ed), expressions, s	tatements,
Students learn to	construct algorithms for solving basic problems and write them in the C language. They master data types (simple, pointers, structure	Z,ZK ed), expressions, s al algorithms for s	tatements,
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Students learn to and functions pre	construct algorithms for solving basic problems and write them in the C language. They master data types (simple, pointers, structure sented in C language. They understand the principle of recursion and basics of algorithm complexity analysis. They know fundament sorting, and manipulating linked lists and trees.	Z,ZK ad), expressions, stal algorithms for stall Z,ZK	tatements, earching,
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BIE-PRR.21 Project management Z,ZK 5 The aim of the course is to introduce students into the basic concepts and principles of project management, i.e. methods of planning, teamwork, analysis, crisis management in a project, communication, argumentation and meeting management. Students will practice project management techniques (e.g. SWOT analysis, risk assessment and management, Gantt charts, resource schedule, resource balancing, network graphs) and creation of project documentation. The course is designed especially for students who are interested in deepening their knowledge outside IT, consider starting their own company, or have ambitions to work in middle or senior management positions in large companies. The course is also suitable for all those who will develop software or hardware in the form of team projects. BIE-PS2 Programming in shell 2 Z,ZK Students get a general overview of scripting languages, introduction into syntax, semantics, programming style, data structures, pros and cons. In addition, they gain a deeper insight into Bourne Again shell and some other particular scripting languages and will get practical experience with shell script programming. Note to Erasmus students: We are ready do adapt the lectures to provide even very basic Bourne shell usage. Depending on actual knowledge of the students, orientation in user filesystem tools (cp, In, mkdir, rm...) and useful basic data filtering tools (cut, tr, sort, uniq...) can be provided. The advantage of this module is that we do not stop at this point - we will show you also a selection of advanced scripting techniques used in practice. BIE-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. Probability and Statistics BIE-PST.21 Students will learn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variables. They will be able to apply basic models of random variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction they will be able to perform estimations of unknown distributional parameters from random sample characteristics. They will also be introduced to the methods for testing statistical hypotheses and determining the statistical dependence of two or more random variables. BIE-SAP.21 Computer Structures and Architectures 5 Students understand basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, inputs, outputs, data storage and transfer. In the labs, students gain practical experience with the design and implementation of the logic of a simple processor using modern digital design tools Computer Engineering Seminar I The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to failures and attacks. Students are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the subject is work with scientific articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers. The topics are new for each semester. BIE-SCE2 Computer Engineering Seminar II The Seminar of Computer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to failures and attacks. Students are approached individually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the subject is work with scientific articles and other professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teachers. The topics are new for each semester. BIE-SEG Systems Engineering Ζ 0 This is an introductory class on systems engineering for bachelor students in computer science. The goal of the class is to introduce basic principles of operating systems for students to understand processor and memory virtualization. Seeing and actually understanding virtualization is the overarching theme of the class. After taking the class, students are able to understand the difference between processes and threads as well as emulation and virtualization, what virtual memory is and how it works, what concurrency is, as opposed to parallelism, and how processes and threads synchronize efficiently to overcome concurrency for communication. **BIE-SEP** World Economy and Business 7.7K 4 The course introduces students of technical universities to international business. It does that predominantly by comparing individual countries and key regions of the world economy. Students get to know about different religions and cultures, necessary for doing business in diverse societies as well as indexes of economic freedom, corruption and economic development, which are needed for the right investment decision. Seminars help to improve knowledge in the form of discussions based on individual readings BIE-SKJ.21 Scripting Languages Join us on a tour into the world of scripted programming. Together, we will unveil the power of Bourne Again shell and PERL as proven industry standards, as well as a couple of other standard text processing utilities (AWK, sed), with some basic UNIX system tools, in many real-world situations like processing web feeds or logs. We will provide a general overview of scripting languages and introduction into their pros and cons and students get practical experience with shell script programming. We will touch also ROFF, PerlDoc, and even TeX to get some insight into how your code documentation can be implemented. And if you know UNIX system-level scripting already, we can show you advanced programming techniques and tricks that get overlooked frequently but increase code robustness or execution efficiency. The course is led by two veteran programmers in the scripting world. Lukáš is a renowned lecturer in advanced shell programming, teaching developers from the IT industry in several CE countries. Jan is a skilled lecturer and developer whose code contributes to safe and streamline operations of cloud service datacenters around the globe. BIE-SP1.21 Team Software Project 1 ΚZ 5 Students gain hands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided in the BIE-SWI course that runs concurrently and that teaches students necessary techniques and principles. Teams consisting of 4-6 students will work on a specific project. The teacher, in the role of the team and project leader, regularly consults with the team (at the seminars) both the formal and material aspects of the software design. The resulting software artefact will be further developed and finished in the BIE-SP2 course. BIE-SP2.21 Team Software Project 2 ΚZ Students gain hands-on experience with the iterative development process while working on a large-scale software project. The first iteration is the result of the BIE-SP1 course project. However, in this follow-up, the functionality, testing, and documentation of the software system being developed will be emphasized. Students will work in teams of 4-6 people. The teacher, in the role of the team and project leader, regularly consults with the team (at the seminars) the formal as well as material aspects of their solution. BIE-ST1 Network Technology 1 Ζ 3 P edm t je zam en na získání základních znalosti z oblasti po íta ových sítí a praktických zkušeností se sí ovými technologiemi. P edm t odpovída látce kurikula Cisco Netacad programu - CCNA1 - R&S Introduction to Networks. Software Engineering Students get acquainted with methods of analysis and design of larger software projects that are typically designed and implemented in teams. They consolidate and practically verify their knowledge during the analysis and design of larger software systems that will be developed in the concurrent course BIE-SP1. Students get hands-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 design and testing. Within the course, students also gain a theoretical basis in the field of project management, estimation of costs of software projects, and methods of their development. Documentation and Presentation BIE-TDP.21 3 The course is focused on the basics of creating electronic documentation with emphasis on the creation of technical reports of a larger scope, typically final university theses. Students learn to create text of a technical report in the LaTeX system, process an electronic presentation using the LaTeX Beamer system, and practically present it in front of classmates and

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 days of teaching. Within the exercises of the course, an active approach to the creation of individual parts of the bachelor's thesis is assumed. BIE-TJV.21 Z.ZK 5 Java Technology The aim of the course is to provide knowledge and skills needed for the development of smaller and larger information systems. Students will get acquainted with general 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 students will be able to participate in the development of software systems on the Java platform. Students are assumed to be acquainted with the following topics (they are used and not taught in this course): Java language syntax, SQL, git version control system, Docker, continuous integration. BIE-TUR.21 User Interface Design 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 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. BIE-TZP.21 Technological Fundamentals of Computers 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 cooling 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 Mathematica. BIE-UOS.21 Unix-like Operating Systems Unix-like operating systems represent a large family mostly open-source codes that kept bringing during the history of computers efficient innovative functions of multiuser operating systems for computers and their networks and clusters. 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 file system. They learn to use practically these systems at the level of advanced users who are not only able to utilize powerful system tools that are available to users, but are also able to automatize routine agenda using the unix scripting interface, called shell. BIE-VAK.21 Selected Combinatorics Applications The course aims to introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the basic courses, we approach the issue from applications to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basic data structures. Furthermore, with the active participation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) informatics. Areas from which we will select problems to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimization and more. Students will also try to implement solutions to the studied problems with a special focus on the effective use of existing tools. **BIE-VMM** Selected Mathematical Methods The lecture begins with an introduction to the analysis of complex functions of a complex variable. Next, we present the Lebesgue integral. We then address Fourier series and their properties. Further, we introduce and study the properties of the Discrete Fourier Transform (DFT) and its fast implementation (FFT). We discuss the wavelet transform. We examine the linear programming problem in more detail and its solution using the Simplex algorithm. Each topic is demonstrated with interesting examples. BIE-VR1.21 Virtual reality I Introduction to Virtual Reality (VR), virtual reality operations, metaverse, and creation. Rules and requirements for virtual worlds communication. The course focuses on the ways of creating virtual reality worlds and interactive activities in 3D worlds. It improves computational thinking, empathy, and shared social activities. **BIE-ZRS** Basics of System Control Z,ZK Volitelný p edm t základy ízení systém je ur en pro všechny zájemce o aplikovanou informatiku v bakalá ském studiu. Alespo p ehledové znalosti oboru automatického ízení budou pro naše absolventy jist konkuren ní výhodou a zhodnotí je bezesporu v pr myslové praxi. Studenti získají znalosti v dynamicky se rozvíjejícím oboru s velkou budoucností. Zam íme se zejména na ízení inženýrských a fyzikálních sysém . Poskytneme vám základní informace z oblasti zp tnovazebního ízení lineárních dynamických jednorozm rových systém . Seznámíme vás s metodami vytvá ení popisu a modelu systém , základní analýzou lineárních dynamických systém a návrhem a ov ením jednoduchých zp tnovazebních PID, PSD a fuzzy regulátor . Pozornost je v nována rovn ž sníma m a ak ním len m v regula ních obvodech, otázkám stability regula ních obvod , jednorázovému a pr b žnému nastavování parametr regulátoru a n kterým aspekt m pr myslových realizací spojitých a íslicových regulátor . Jednotlivá témata p ednášek jsou provázena množstvím užite ných p íklad a praktických pr myslových realizací. Artificial Intelligence Fundamentals BIF-7UM Students are introduced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical tasks from the areas of state space search, multi-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithms and the neural networks, will be presented as well. Programovací praktika 1 FIT-ACM1 ΚZ 5 Tento výb rový kurz má za cíl p ipravit ty nejlepší studenty na reprezentaci fakulty v rámci mezinárodních ACM sout ží FIT-ACM2 Programovací praktika 2 ΚZ 5 Tento výb rový kurz má za cíl p ipravit ty nejlepší studenty na reprezentaci fakulty v rámci mezinárodních ACM sout ží FIT-ACM3 Programovací praktika 3 ΚZ 5 Tento výb rový kurz má za cíl p ipravit ty nejlepší studenty na reprezentaci fakulty v rámci mezinárodních ACM sout ží. FIT-ACM4 K7 Programovací praktika 4 5 Tento výb rový kurz má za cíl p ipravit ty nejlepší studenty na reprezentaci fakulty v rámci mezinárodních ACM sout ží. FIT-ACM5 Programovací praktika 5 ΚZ 5 Tento výb rový kurz má za cíl p ipravit ty nejlepší studenty na reprezentaci fakulty v rámci mezinárodních ACM sout ží. FIT-ACM6 ΚZ 5 Programovací praktika 6 Tento výb rový kurz má za cíl p ipravit ty nejlepší studenty na reprezentaci fakulty v rámci mezinárodních ACM sout ží. FITE-EHD Introduction to European Economic History The course introduces a selection of themes from European economic history. It gives the student basic knowledge about forming of the global economy through the description of the key historical periods. As European countries have been dominant actors in this process it focuses predominantly on their roles in economic history. From the large economic area of the Roman Empire to the fragmentation of the Middle Ages, from the destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The course does not cover the detailed economic history of particular European countries but rather the impact of trade and the role of particular events, institutions and organizations in history. Class meetings will consist of a mixture of lectures and discussions. FITE-SEP World Economy and Business 4 The course introduces students of technical universities to international business. It does that predominantly by comparing individual countries and key regions of the world economy. Students get to know about different religions and cultures, necessary for doing business in diverse societies as well as indexes of economic freedom, corruption and economic development, which are needed for the right investment decision. Seminars help to improve knowledge in the form of discussions based on individual readings TV2K1 T lesná výchova 2 Ζ 1 T lovýchovný kurz **TVKLV** Ζ 0 TVV T lesná výchova 7

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Kurz pokro ilé eštiny pro ukrajinské studenty, kte í mají status uprchlíka. Zkouška potvrdí znalost eštiny na úrovní B2 s platností pro VUT.						

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