Study plan

Name of study plan: Bachelor branch Web and Software Engineering, spec. Software Engineering, in English, 2015-2020

Faculty/Institute/Others: Department: Branch of study guaranteed by the department: Welcome page Garantor of the study branch: Program of study: Informatics, valid until 2024 Type of study: Bachelor full-time Required credits: 158 Elective courses credits: 22 Sum of credits in the plan: 180 Note on the plan: The study plan is intended for those students who have been accepted to study since the academic year 2015/2016.

Name of the block: Compulsory courses in the program Minimal number of credits of the block: 116 The role of the block: PP

Code of the group: BIE-PP.2015 Name of the group: Compulsory Courses od Study Program Infomatics, Presented in English, Version 2015 Requirement credits in the group: In this group you have to gain 116 credits Requirement courses in the group: In this group you have to complete 20 courses Credits in the group: 116 Note on the group:

Note on the g	Jioup.					
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
BIE-AG1	Algorithms and Graphs 1 Dušan Knop	Z,ZK	6	2P+2C	Z	PP
BIE-AAG	Automata and Grammars	Z,ZK	6	2P+2C	Z	PP
BIE-BPR	Bachelor Project Zden k Muziká Zden k Muziká (Gar.)	Z	2		Z,L	PP
BIE-BAP	Bachelor Thesis Zden k Muziká Zden k Muziká (Gar.)	Z	14		L,Z	PP
BIE-PSI	Computer Networks	Z,ZK	5	2P+1R+1C	L	PP
BIE-SAP	Computer Structures and Architectures	Z,ZK	6	2P+1R+2C	L	PP
BIE-DBS	Database Systems	Z,ZK	6	3L	Z,L	PP
BIE-CAO	Digital and Analog Circuits	Z,ZK	5	2P+2C	Z	PP
BIE-DPR	Document., Presentation, Rhetorics Dana Vynikarová Dana Vynikarová Dana Vynikarová (Gar.)	KZ	4		L	PP
BIE-ZMA	Elements of Calculus Antonella Marchesiello Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	6	3P+2C	Z	PP
BIE-ZDM	Elements of Discrete Mathematics Ji ina Scholtzová, Jan Legerský Ji ina Scholtzová Josef Kolá (Gar.)	Z,ZK	5	2P+2C	Z	PP
BIE-LIN	Linear Algebra Antonella Marchesiello Antonella Marchesiello Antonella Marchesiello (Gar.)	Z,ZK	7	4P+2C	L	PP
BIE-MLO	Mathematical Logic Kate ina Trlifajová Kate ina Trlifajová Kate ina Trlifajová (Gar.)	Z,ZK	5	2P+2C	Z	PP
BIE-OSY	Operating Systems	Z,ZK	5	2P+1R+1L	. L	PP
BIE-PST	Probability and Statistics	Z,ZK	5	2P+1R+1C	Z	PP
BIE-PA1	Programming and Algorithmics 1	Z,ZK	6	2P+2R+2C	Z	PP
BIE-PA2	Programming and Algorithmics 2 Jan Trávní ek	Z,ZK	7	2P+1R+1C	; L	PP
BIE-PS1	Programming in Shell 1	KZ	5	2P+2C	Z	PP

BIE-BEZ	Security Ji í Bu ek	Z,ZK	6	2P+1R+1C	L	PP
BIE-SI1.2	Software Engineering I Zden k Rybola Zden k Rybola Zden k Rybola (Gar.)	Z,ZK	5	2P+1C	Z,L	PP

Characteristics of the courses of this group of Study Plan: Code=BIE-PP.2015 Name=Compulsory Courses od Study Program Infomatics, Presented in English, Version 2015

BIE-AG1	Algorithms and Graphs 1	Z,ZK	6
	basics from the efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every comp	-	
	-AAG and BIE-ZDM courses in which the students gain the basic skills and knowledge needed for time and space complexity	of algorithms and	d learn to handle
practically the asympto	ic mathematics.		
BIE-AAG	Automata and Grammars	Z,ZK	6
Students are introduce	d to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of fir	nite automata, reg	ular expressions
	translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, relationships betwee		
	rough the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translatio	n, and design of	digital circuits.
BIE-BPR	Bachelor Project	Z	2
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	student will perfo	orm during the
semester. If he fulfill the	ese tasks, the supervisor will award him / her at the end of the semester with the BI-BPR course.		
BIE-BAP	Bachelor Thesis	Z	14
BIE-PSI	Computer Networks	Z,ZK	5
Students understand th	basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks focus		2nd to 4th layer
of the ISO OSI model. ⁻	They also get a basic understanding of communication media, security, and network administration. Students will be able to w	rite a simple netv	vork application
and configure a simple	network.		
BIE-SAP	Computer Structures and Architectures	Z,ZK	6
	asic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, in		ita storage and
	dents gain practical experience with the design and implementation of the logic of a simple processor using modern digital d		U
BIE-DBS	Database Systems	Z.ZK	6
	d to the database engine architecture and typical user roles. They are briefly introduced to various database models. They lea	· ·	1
	straints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with	•	
	n - the relational database model. They learn the principles of normalizing a relational database schema. They understand the fu		-
	parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduc		
in relational databases	with respect to speed of access to large quantities of data. This introductory-level module does not cover: Administration of d	atabase systems	, debugging and
optimizing database ap	plications, distributed database systems, data stores.	-	
BIE-CAO	Digital and Analog Circuits	Z.ZK	5
	mental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and	, ,	-
-	its, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences l		-
of electronic devices.		Ū	C C
BIE-DPR	Document., Presentation, Rhetorics	KZ	4
	the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create an	1	ive presentations
	an audience. Students will also learn to write technical reports and scientific texts. There is no fixed schedule for BIE-DPR. A		-
start of the semester.			
BIE-ZMA	Elements of Calculus	Z.ZK	6
Students acquire know	ledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking	g and reasoning a	ind are able to
use basic proof technic	ues. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the	links between the	e integrals and
sums of sequences. Th	ey are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic expressions.		
BIE-ZDM	Elements of Discrete Mathematics	Z,ZK	5
Students get both a ma	, thematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula a		tools for solving
recurrent equations.			
BIE-LIN	Linear Algebra	Z,ZK	7
	e theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependence		
linear. They know the b	asic methods for operating with polynomials and linear spaces. They are able to perform matrix operations and solve systems	s of linear equatio	ns. They can
apply these mathemati	cal principles to solving problems in 2D or 3D analytic geometry. They understand error-detecting and error-correcting codes.		
BIE-MLO	Mathematical Logic	Z,ZK	5
An introduction to prop	sitional and predicate logic.	1 7	I
BIE-OSY	Operating Systems	Z,ZK	5
	e classical theory of operating systems (OS) in addition to the knowledge gained in the BI-PS1 module. They get a solid knowledge gained in the BI-PS1 module.		-
	ations. They understand the problems of race conditions and principles and algorithms for critical sections, thread scheduling	-	-
They understand the te	chniques of managing virtual memory, principles and architectures of disks and disk arrays, file systems and peripheral devic	ces. They gain bas	sic knowledge
necessary for developin	ng system applications or for system administration. They are able to design and implement simple multithreaded applications	3.	-
BIE-PST	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 vari		-
	n variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical indu		
estimations of unknowr	n distributional parameters from random sample characteristics. They will also be introduced to the methods of determining th	e statistical depe	ndence of two or
more random variables			
BIE-PA1	Programming and Algorithmics 1	Z,ZK	6
	ruct algorithms for solving basic problems and write them in the C language. They understand data types (simple, structured, p		1
	cursion. They learn the basics of algorithm complexity analysis. They know fundamental algorithms for searching, sorting, an		
BIE-PA2	Programming and Algorithmics 2	Z,ZK	7
	ruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack		1
table). They can implem	ent linked structures. They learn these skills using the programming language C++. Although this is not a module of programmi	ng in C++, studen	ts are introduced

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BIE-PS1	Programming in Shell 1	KZ	5			
Students understand the	e basic principles of operating systems (processes and threads, file systems, access rights, memory management, network in	nterface) with a fo	cus on UNIX like			
operating systems. In pr	actically oriented exercises, they will learn to use shell, basic commands and filters for processing text data.					
BIE-BEZ	Security	Z,ZK	6			
Students understand the	mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmet	tric and asymmetri	c cryptosystems,			
and hash functions. The	y also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryp	otosystems for cor	mputer systems.			
They are able to proper	y and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to lega	al aspects of inform	mation security,			
security standards, soci	security standards, social engineering, and basic principles of security management.					
BIE-SI1.2	Software Engineering I	Z,ZK	5			
	Software Engineering I lods of analysis and design of large software systems, which are typically designed and implemented in teams. Students will	I ' I	-			
Students learn the meth		get acquainted w	vith CASE tools			
Students learn the meth using a visual modeling	ods of analysis and design of large software systems, which are typically designed and implemented in teams. Students will	get acquainted w s, design, architec	vith CASE tools sture, validation,			
Students learn the meth using a visual modeling verification, and testing	ods of analysis and design of large software systems, which are typically designed and implemented in teams. Students will language UML for modeling and solving software-related problems. Students will get an overview of object-oriented analysis	get acquainted w s, design, architec n parallel (only sur	vith CASE tools eture, validation, mmer semester),			
Students learn the meth using a visual modeling verification, and testing the students can work of	ods of analysis and design of large software systems, which are typically designed and implemented in teams. Students will language UML for modeling and solving software-related problems. Students will get an overview of object-oriented analysis processes. The knowledge obtained in the lectures is practiced on a team project. If enrolled for the BIE-SP1 course running in	get acquainted w s, design, architec n parallel (only sur students programr	vith CASE tools eture, validation, mmer semester),			
Students learn the meth using a visual modeling verification, and testing the students can work of	ods of analysis and design of large software systems, which are typically designed and implemented in teams. Students will language UML for modeling and solving software-related problems. Students will get an overview of object-oriented analysis processes. The knowledge obtained in the lectures is practiced on a team project. If enrolled for the BIE-SP1 course running in n a single more complex project and they are classified to both courses for a single project. This course does not teach the s	get acquainted w s, design, architec n parallel (only sur students programr	vith CASE tools eture, validation, mmer semester),			

Minimal number of credits of the block: 32

The role of the block: PZ

Code of the group: BIE-PZ-WSI-SI.2015

Name of the group: Compulsory Courses of Bachelor Specialization Software Engineering, in English, Version 2015

Requirement credits in the group: In this group you have to gain 32 credits Requirement courses in the group: In this group you have to complete 8 courses Credits in the group: 32

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BIE-KOM	Conceptual Modelling Marek Suchánek, Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	2P+2C	Z	PZ
BIE-TJV	Java Technology Ond ej Guth	Z,ZK	4	2P+2C	Z	PZ
BIE-PAI	Law and Informatics	ZK	3	2P	Z	PZ
BIE-OOP	Object-Oriented Programming Filip K ikava Filip K ikava Filip K ikava (Gar.)	Z,ZK	4	2P+2C	Z	PZ
BIE-PPA	Programming Paradigms	Z,ZK	5	2P+2C	Z	PZ
BIE-SI2.3	Software Engineering 2 Michal Valenta Michal Valenta (Gar.)	Z,ZK	3	2P	Z	PZ
BIE-SP1	Team Software Project 1 Zden k Rybola	KZ	4	2C	Z,L	PZ
BIE-SP2.2	Team Software Project 2 Zden k Rybola Zden k Rybola (Gar.)	KZ	4		Z	PZ

Characteristics of the courses of this group of Study Plan: Code=BIE-PZ-WSI-SI.2015 Name=Compulsory Courses of Bachelor Specialization Software Engineering, in English, Version 2015

BIE-KOM	Conceptual Modelling	Z,ZK	5		
The course focuses on t	he development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the	ability to distingu	ish key concepts		
in the domain, categoriz	e and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will	learn the basics	of ontological		
structural modeling in O	ntoUML notation. They will also learn to express the rules and limitations of everyday reality using the OCL language. Stude	nts will also learn	the basics of		
Enterprise Engineering as a discipline enabling conceptual modeling of the structure of enterprises and institutions and their process and learn the DEMO methodology. The course is					
also designed with regard to the continuity of software implementations.					
BIE-TJV	Java Technology	Z,ZK	4		
The subject goal is to introduce the programming language Java. The student gains practical experiences for smaller enterprise application programming. This subject presents how					
to build the three and me	ore layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestWe	b services, JNDI	etc.). At the		
course end is student at	ble to create three layers enterprise application.				
BIE-PAI	Law and Informatics	ZK	3		
Students have knowledg	e of fundamental protection of intangible property, overview of contractual aspects of copyright. They are able to design an ap	propriate contract	-based copyright		
protection and do resear	rch and verification of the outputs concerning trademarks, patents, industrial design rights. They are able to participate active	ely in the proceed	ings to register		
intangible property. They	have a good overview of the Czech Republic legislation as well as the EU legislation.				
BIE-OOP	Object-Oriented Programming	Z,ZK	4		
Object-oriented program	ming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate togeth	er by message pa	assing. In this		
course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software development including testing, error					
handing, refactoring and	I design patterns.				
BIE-PPA	Programming Paradigms	Z,ZK	5		

Students will learn to work me the functions of individual role	itware Engineering 2 ethodically with respect to software development methodic, especially Unified Process n es in a typical software team, as well as get a practical experience with them in the co ng software quality. This knowledge will get extended with a practical experience than	oncurrent BIE-SP2	module. St	Language (udents will a	also get an ide	
	am Software Project 1				KZ	4
	on a complex team project applying all the knowledge obtained in the BIE-SI1.2 cour in parallel with BIE-SI1.2 course.	se. There are no l	ectures and	no seminar	rs/tutorials in th	nis course.
	am Software Project 2 prience with the iterative development process while working on a large-scale software	project The first it	eration is th			4 urse project
	onality, testing, and documentationof the system being developed will be emphasized					
of the teamand project leade	r, regularly consults with the team (at the seminars) the formal as well as material asp	ects of their solut	ion.			
Name of the block	k: Povinné ekonomické					
	of credits of the block: 4					
The role of the blo	ock: PE					
Code of the group	b: BIE-PP-EM.2015					
Name of the grou	p: Compulsory Economics and Management Bacl	nelor Cour	ses, in	Englisł	n, Versio	n 2015
Requirement cred	tits in the group: In this group you have to gain 4 c	redits				
Requirement cou	rses in the group: In this group you have to comple	ete 1 cours	se			
Credits in the gro	up: 4					
Note on the group):					
	Name of the course / Name of the group of courses					
Code	(in case of groups of courses the list of codes of their members)	Completion	Credits	Scope	Semester	Role
	Tutors, authors and guarantors (gar.)					
BIE-EMP	Economic and management principles Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	KZ	4	2P+2C	Z,L	PE
Characteristics of the Bachelor Courses, in	courses of this group of Study Plan: Code=BIE-PP-EM.2015 N English, Version 2015	lame=Compu	Ilsory Ec	onomics	s and Mana	igement
This course is aimed to fundate enterprise putting into state ente	pnomic and management principles amental problems of business economy. The course makes students familiar with a life economic environment (CR), management of property and capital structure, business and costs, evaluation of enterprise financial health and business rehabilitation or term	transaction record	-	y with fields	-	
Name of the block	k: Compulsory elective economic-management co					
	of credits of the block: 4	u1565				
The role of the blo						
Code of the arour	b: BIE-PV-EM.2015					
• •	p: Compulsory Elective Economics, and Managen	nent Cours	ses in l	English	Version	2015
•	lits in the group: In this group you have to gain at l			•		12015
•	rses in the group: In this group you have to gain at		•		10)	
Credits in the gro				30		
Note on the group	•					
	Name of the course / Name of the group of courses					
Code	(in case of groups of courses the list of codes of their	Completion	Credits	Scope	Semester	Role
Cout	members) Tutors, authors and guarantors (gar.)	Completion	oreand	CCCpc	Comotor	Role
BIE-EPR	Economic project	Z	1		L	VE
BIE-FTR.1	Tomáš Evan Tomáš Evan Tomáš Evan (Gar.) Financial Markets	Z,ZK	5	2P+2C	L	VE
	Pavla Vozárová Fundamentals of Microeconomics					
BIE-MIK	Tomáš Evan. Pavla Vozárová Tomáš Evan Pavla Vozárová (Gar.)	Z,ZK	4	2P+2C	L	VE

Characteristics of the courses of this group of Study Plan: Code=BIE-PV-EM.2015 Name=Compulsory Elective Economics, and Management Courses, in English, Version 2015

Introduction to European Economic History Tomáš Evan Tomáš Evan (Gar.)

BIE-EHD

BIE-EPR	Economic project	Z	1
This course is an extens	sion of the course Introduction to European Economic History (BIE-EHD). There is no fixed schedule for BIE-EPR. A teacher	will contact you b	efore the start of
the semester.			

Z,ZK

3

2P+1C

L

VE

BIE-FTR.1	Financial Markets	Z,ZK	5			
Financial sector has be	en deeply transformed in the recent years, which led to a development of structured financial products, a new point of view o	n the issue of cre	dit risk, and			
globalization of market	activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial acti	vities, many firms	need graduates			
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. The Financial						
Markets course thus en	Markets course thus englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistical tools used in this field.					
BIE-MIK	Fundamentals of Microeconomics	Z,ZK	4			
This a introductory cour	se of microeconomics designed for students without previous economic background. It describes different market regimes ar	nd ways how firm	can react to			
consumer demand, con	npetitor strategies, government intervention, uncertainty and information asymmetry. All concepts are illustrated on real life ex	kamples.				
BIE-EHD	Introduction to European Economic History	Z,ZK	3			
The course introduces a	a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global ϵ	conomy through	the description			
of the key periods in his	tory. As European countries have been dominant actors in this process it focuses predominantly on their roles in the econom	ic history. From la	arge economic			
area of Roman Empire	to fragmentation of the Middle Ages, from destruction of WWII to the current affairs, the development of modern financial inst	itutions is deciphe	ered. The course			
does not cover detailed	economic history of particular European countries but rather the impact of trade and role of particular events, institutions and	d organizations in	history. Class			
meetings will consist of	a mixture of lecture and discussion.					

Name of the block: Compulsory elective humanities courses Minimal number of credits of the block: 2 The role of the block: VH

Code of the group: BIE-PV-HU.2015

Name of the group: Compulsory Elective Bachelor Social Courses, Presented in English, Ver. 2015 Requirement credits in the group: In this group you have to gain at least 2 credits (at most 9) Requirement courses in the group: In this group you have to complete at least 1 course (at most 3) Credits in the group: 2

Faculty guarantees the availability of these modules. Note on the group: Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Code Completion Credits Scope Semester Role members) Tutors, authors and guarantors (gar.) **History of Mathematics and Informatics BIE-HMI** Z,ZK 3 2P+1C L VН Alena Šolcová Alena Šolcová Alena Šolcová (Gar.) Ζ FI-HPZ 3 0+0 Z,L VH Humanities subject from a study abroad Introduction to European Economic History BIE-EHD L Z,ZK 3 2P+1C VН Tomáš Evan Tomáš Evan Tomáš Evan (Gar.) Philosophy 1 BE0B16FI1 K7 4 2P+2S Z,L VН Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)

Characteristics of the courses of this group of Study Plan: Code=BIE-PV-HU.2015 Name=Compulsory Elective Bachelor Social Courses, Presented in English, Ver. 2015

BIE-EHD	Introduction to European Economic History	Z,ZK	3			
The course introduces a	a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global e	conomy through	the description			
of the key periods in his	of the key periods in history. As European countries have been dominant actors in this process it focuses predominantly on their roles in the economic history. From large economic					
area of Roman Empire to fragmentation of the Middle Ages, from destruction of WWII to the current affairs, the development of modern financial institutions is deciphered. The course						
does not cover detailed	does not cover detailed economic history of particular European countries but rather the impact of trade and role of particular events, institutions and organizations in history. Class					
meetings will consist of	a mixture of lecture and discussion.					
BIE-HMI	History of Mathematics and Informatics	Z,ZK	3			
Students will master the	methods traditionally used in mathematics and related disciplines - informatics - from different periods of the development of n	nathematics, and	will thus become			
acquainted with mathen	natical methods suitable for applications in contemporary computer science.					
FI-HPZ	Humanities subject from a study abroad	Z	3			
A "Humanities subject th	nat has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module t	hat is required in	the curriculum.			
The substitution is appre	oved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.					
BE0B16FI1	Philosophy 1	KZ	4			
We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old						
philosophical thoughts v	vith recent problems of science, technology, economics and politics.					

Name of the block: Elective courses Minimal number of credits of the block: 0 The role of the block: V

Code of the group: BIE-V-PRO_MG

Name of the group: Elective Courses, Suitable for those who intend to apply for Master's program at FIT, in English

Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

Modules in this group are recommended for students who intend to enroll to master program at FIT.

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
BIE-EFA	Efficient Algorithms <i>Ji ina Scholtzová</i>	Z,ZK	5	2P+2C	z	V
BIE-GRA	Graph Algorithms and Complexity Theory Josef Kolá	Z,ZK	5	2P+2C	L	V

Characteristics of the courses of this group of Study Plan: Code=BIE-V-PRO_MG Name=Elective Courses, Suitable for those who intend to apply for Master's program at FIT, in English

BIE-EFA	Efficient Algorithms	Z,ZK	5			
Students get an overview of efficient algorithms and data structures for solving classical algorithmic problems, such as searching and sorting, on dynamically changing data sets.						
Students are able to design and implement such algorithms, to use methods for analysing their computational and memory complexity. They understand the sorting algorithms with						
O(n.log n) time complex	O(n.log n) time complexity, special sorting algorithms with linear complexity, algorithms for associative and address searching. They are able to use the efficient dynamic data structures,					
such as hash tables, se	arch trees, balanced search trees, heaps, B-trees, and others. They are able to work with recursive algorithms and dynamic	programming.				
BIE-GRA	Graph Algorithms and Complexity Theory	Z,ZK	5			
Students get an overview of typical usages of graph models in computing. They learn algorithmic methods of solving graph problems. They understand algorithms for the key application						
domains of graph theory (flows in networks, heuristic search, approximation of complex problems). Students get basic competence in computer science background: they understand						
Turing machine models	and issues of NP-completeness and NP-hardness.					

Code of the group: BIE-WSI-SI-VO.2017

Name of the group: Elective Vocational Courses for Bachelor Specialisation BIE-WSI-SI, Version 2017 Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

Oborové předměty všech oborů včetně povinných předmětů zaměření s výjimkou zaměření BIE-WSI-SI-VO.2017

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
BIE-AG2	Algorithms and Graphs 2 Ond ej Suchý	Z,ZK	5	2P+2C	L	V
BIE-APS.1	Architectures of Computer Systems	Z,ZK	5	2P+2C	Z	V
BIE-VZD	Data Mining Daniel Vašata, Rodrigo Augusto Da Silva Alves Daniel Vašata Daniel Vašata (Gar.)	Z,ZK	4	2P+2C	Z	V
BIE-BIG	DB Technologies for Big Data	KZ	4	2P+2C	Z	V
BIE-HWB	Hardware Security Filip Kodýtek, Róbert Lórencz, Ji í Bu ek Ji í Bu ek Róbert Lórencz (Gar.)	Z,ZK	5	2P+2C	Z	V
BIE-PJP	Programming Languages and Compilers	Z,ZK	5	2P+1C	L	V
BIE-VWM	Searching Web and Multimedia Databases	Z,ZK	5	2P+1C	L	V
BIE-BEK	Secure Code Róbert Lórencz	Z,ZK	5	2P+2C	L	V
BIE-SSB	System and Network Security Ji í Dostál Ji í Dostál Ji í Dostál (Gar.)	Z,ZK	5	2P+2C	Z	V
BIE-ADU.1	Unix Administration	Z,ZK	5	2P+2C	L _	V
BIE-TWA.1	Web Application Design	Z,ZK	5	2P+2C	Z	V
BIE-ADW.1	Windows Administration Miroslav Prágl, Ji í Kašpar Miroslav Prágl Miroslav Prágl (Gar.)	Z,ZK	4	2P+1C	Z	V
BIE-XML	XML Technology	Z,ZK	4	2P+2C	Z	V

Characteristics of the courses of this group of Study Plan: Code=BIE-WSI-SI-VO.2017 Name=Elective Vocational Courses for Bachelor Specialisation BIE-WSI-SI, Version 2017

BIE-AG2	Algorithms and Graphs 2	Z,ZK	5			
BIE-APS.1	Architectures of Computer Systems	Z,ZK	5			
Students will learn the	onstruction principles of internal architecture of computers with universal processors at the level of machine instructions. Sp	ecial emphasis is	given on the			
pipelined instruction pro	pressing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the j	principles of instru	ction processing			
not only in scalar proce	ssors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of	the sequential mo	del of programs.			
The course further elab	orates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence	and consistency	in such systems.			
BIE-VZD	Data Mining	Z,ZK	4			
Students are introduced	Students are introduced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, multidimensional data visualization,					
statistical techniques of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships between model bias and variance,						
and know the fundamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic data mining tools to common						
problems (classification	, regression, clustering).					

BIE-BIG	DB Technologies for Big Data	KZ	4
-	into the field of Big Data. These are data that the standard relational databases cannot process efficientlydue to the size, an		
	information that can have key importance for the competitiveness of a company or organization. The course is focused practic		
	echnologies, such as Apache Cassandra, Apache Hadoop, Apache Solr, and others. The course brings to students theoretica		
	labs, students learn to develop their own applications on topof these technologies.	inoundation of alg	
BIE-HWB	Hardware Security	Z,ZK	5
	ardware resources used to ensure security of computer systems including embedded ones. The students become familiar wi	· ·	
	the security features of modern processors, and storage media protection through encryption. They will gain knowledge about		
	ttacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card		
	ulti-factor authentication (biometrics). Students will understand the problems of effective implementation of ciphers.	toorniology morae	ing applications
BIE-PJP	Programming Languages and Compilers	Z.ZK	5
	nethods of implementation of common high-level programming languages. They get experience with the design and implement	, ,	-
	ing language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that h		
	er based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages,		
	ing text in a language defined by a LL(1) grammar.		
BIE-VWM	Searching Web and Multimedia Databases	Z.ZK	5
	wledge concerning retrieval techniques on the web, where the web environment is viewed as a large distributed and heteroge	, I	-
s a	tand the techniques for retrieving text and hypertext documents (the web pages). Moreover, they will be aware of similarity re		
heterogenous multimed	ia databases (unstructured data collections, respectively).		
BIE-BEK	Secure Code	Z,ZK	5
	ow to assess security risks and how to take them into account in the design phase of their own code and solutions. After gettin		threat modeling
theory, students gain pr	actical experience with running programs with reduced privileges and methods of specifying these privileges, since not every	program needs t	o run with
administrator privileges	Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securin	g data and the rel	ationships of
security and database	ystems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and the	defense against th	iem.
BIE-SSB	System and Network Security	Z,ZK	5
The students will under	stand the public key infrastructure (PKI), its strengths and weaknesses, its vulnerabilities againstattacks. The students will al	o understand the	analysis of
network protocols from	the perspectives of: authentication and authorisation, key exchange, and encryption. They get an overview of the security med	chanisms of opera	ating systems
(OSs), of the ways virtu	alization canbe used to protect OSs, and of the security mechanisms for the OS memory. The students will learn basic metho	ods of forensic and	alysisof storage
media and networks. Th	e students will also understand security of the networking infrastructure and its protocols andwill be able to design and imple	ment a secured a	nd survivable
network. Students will a	lso get an overview of securing data in clouds, database systems, and servers.		
BIE-ADU.1	Unix Administration	Z,ZK	5
BIE-TWA.1	Web Application Design	Z,ZK	5
The basic course of we	o application development. Initially, the students become familiar with HTTP and its possibilities and partly with some properti	es of language de	escribing the
structure (HTML) and p	resentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web application	s, which will be de	emonstrated in
modern libraries facilita	e the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symfo	ony 2, Doctrine 2.	Developments
on the client side will be	demonstrated using a JavaScript language with library jQuery and possibly MV* framework AngularJS.		
BIE-ADW.1	Windows Administration	Z,ZK	4
Students understand th	e architecture and internals of the Windows OS and acquire the skills to administrate the Windows OS. They are able use the	standard adminis	stration and
	advanced ActiveDirectory administration methods. They are able to solve problems by applying appropriate troubleshooting	methods and adm	ninistrate
· ·	Students are able to effectively configure centralised administration of a computer network.		
BIE-XML	XML Technology	Z,ZK	4
Code of the ar	oun [.] BIE-V 2017		

Code of the group: BIE-V.2017 Name of the group: Purely Elective Bachelor Courses, Version 2017

Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BIE-ZUM	Artificial Intelligence Fundamentals Pavel Surynek Pavel Surynek Pavel Surynek (Gar.)	Z,ZK	4	2P+2C	L	V
BIE-ZRS	Basics of Systems Control	Z,ZK	4	2P+2C	L	V
BIE-CCN	Compiler Construction Christoph Kirsch Christoph Kirsch (Gar.)	Z,ZK	5	3P	L	V
BIE-SCE1	Computer Engineering Seminar I Miroslav Skrbek, Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	Z	V
BIE-SCE2	Computer Engineering Seminar II Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L	V
BIE-CZ0	Czech Language for Foreigners Markéta Hofmannová, Ivana Vondrá ková, Tomáš Houdek, Petra Korfová Zden k Muziká Zden k Muziká (Gar.)	КZ	2	4C	Z,L	V
BIE-CZ1.21	Czech Language for Foreigners II Ivana Vondrá ková, Petra Korfová Zden k Muziká Zden k Muziká (Gar.)	KZ	2	4C	Z,L	V
BIE-FTR.1	Financial Markets Pavla Vozárová	Z,ZK	5	2P+2C	L	V
BIE-EHD	Introduction to European Economic History Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	3	2P+1C	L	V

BIE-IMA	Introduction to Mathematics	Z	4	3C	Z	V
BIE-IMA2	Introduction to Mathematics 2	Z	2	1C	Z	V
BIE-ST1	Network Technology 1	Z	3	2C	Z	v
BIE-OOP	Alexandru Moucha Alexandru Moucha (Gar.) Object-Oriented Programming	Z,ZK	4	2P+2C	Z	v
	Filip K ikava Filip K ikava Filip K ikava (Gar.) Preparatory Mathematics			21 120		
BIE-PKM	Jitka Rybní ková Tomáš Kalvoda (Gar.)	Z	4		Z	V
BIE-PJV	Programming in Java Jan Blizni enko Jan Blizni enko Jan Blizni enko (Gar.)	Z,ZK	4	2P+2C	Z	V
BIE-PS2	Programming in shell 2	Z,ZK	4	2P+2C	L	V
BIE-PRR.21	Project management David Pešek David Pešek (Gar.)	Z,ZK	5	2P+2C	Z,L	V
BIE-VAK.21	Selected Combinatorics Applications Tomáš Valla, Dušan Knop, Ond ej Suchý, Šimon Schierreich, Maria Saumell Mendiola Tomáš Valla Tomáš Valla (Gar.)	Z	3	2R	L	v
BI-SCE1	Computer Engineering Seminar I Hana Kubátová Hana Kubátová Hana Kubátová (Gar.)	Z	4	2C	L,Z	V
TV2K1	Physical Education 2	Z	1		L	V
BIE-SEP	World Economy and Business Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	4	2P+2C	Z	v
BIE-3DT.1	3D Printing	KZ	4	3C	L	V
Object-oriented programmin course we look at some of th handing, refactoring and de		-		ogether by me e developmer	nt including to	esting, erro
	nancial Markets				,ZK	5
	eeply transformed in the recent years, which led to a development of structured financi ities. The need to use and properly apply mathematical and technical tools is emphasiz	•				
rom technical schools who	have sufficient knowledge ICT and mathematics, and who have at the same time an ur	nderstanding of th	e functioni	ng of financia	I markets. Th	e Financial
	es both a description of financial markets and related economic theories, and an overv	iew of mathemati	cal and sta	itistical tools u	ised in this fi	eld.
	troduction to European Economic History			7	7K	3
	troduction to European Economic History lection of themes from the European economic history. It gives the student basic knowle	edge about formi	ng of the gl	1	,ZK	3 description
The course introduces a sel of the key periods in history.	ection of themes from the European economic history. It gives the student basic knowle As European countries have been dominant actors in this process it focuses predomir	antly on their role	es in the ec	obal economy	, through the ry. From large	description e economic
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The course introduces a sel of the key periods in history. area of Roman Empire to fra does not cover detailed eco meetings will consist of a mi BIE-ZUM Ar Students are introduced to th space search, multi-agent sy be presented as well. BIE-ZRS Ba Optional subject Basics of S be definitely evaluated by or control of engineering and p system models, basic linear methods of creating a descri is also given to sensors and ndustrial implementation of mplementations. BIE-CCN CC This is an introductory class understand the design and it BIE-SCE1 CC The Seminar of Computer E are approached individually articles and other profession semester. BIE-CZ0 Cz Course Czech for foreigners BIE-CZ1.21 Cz	ection of themes from the European economic history. It gives the student basic knowle. As European countries have been dominant actors in this process it focuses predomin agmentation of the Middle Ages, from destruction of WWII to the current affairs, the devi- nomic history of particular European countries but rather the impact of trade and role of ixture of lecture and discussion. tificial Intelligence Fundamentals he fundamental problems in the Artificial Intelligence, and the basic methods for their so systems, game theory, planning, and machine learning. Modern soft-computing methods asics of Systems Control Bystem Control is designed for anyone interested in applied computer science in bache ar graduates in the industrial practice. Students will gain knowledge in this rapidly evolv obysical systems. We will provide basic information from the feedback control of linear of dynamic systems analysis and design verification, simple PID feedback, PSD and fuzz iption of the system model, the basic linear dynamic systems, single and continuous continuous and digital controllers and PLC control. The themes of lectures are accomp ompiler Construction on compiler construction for bachelor students in computer science. The goal of the cl implementation of programming languages. Seeing and actually understanding self-cor omputer Engineering Seminar I ngineering is a (s)elective course for students who want to deal with deeper topics of dig within the subject. Each student or group of students solves some interesting topic with al literature and/or work in K_N laboratories. The capacity of the subject is limited by the promuter Engineering Seminar II ngineering is a (s)elective course for students who want to deal with deeper topics of dig within the subject. Each student or group of students solves some interesting topic with and literature and/or work in K_N laboratories. The capacity of the subject is limited by the promuter Engineering Seminar II	anantiy on their role relopment of mod f particular event living. It focuses n s, including the event ing field of great if lynamical SISO s y controllers. This ation and simple adjustment of the panied by a numb ass is to introduc mpilation is the over ital design, reliab in the selected sup ne possibilities of ital design, reliab in the selected sup ne possibilities of udy, Travel, Time	es in the ecclern financia s, institution nainly on the rolutionary a f introduction future. We way ystems. We s is a survey PID feedba e controller er of usefu e basic prin verarching t ility and res pervisor. Pa the semina the semina , Family.	obal economy conomic histor al institutions ins and organi Z e classical tat algorithms an Z on to the field will focus our s e will teach yo y course in wh tack, PSD and fi parameters a I examples ar Z nciples of com theme of the co- istance to failu art teachers. Th istance to failu art of the subj- ar teachers. Th	y through the y From large is deciphere zations in his ,ZK	description e economic d. The cour story. Class 4 areas of sta networks, v 4 c control will ticularly on n methods of s will learn t lers. Attenti spects of th networks to 4 dents to 4 ucks. Studen ith scientifi new for ea 2 2

BIE-IMA	Introduction to Mathematics	Z	4
	tend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they a	re able to apply tr	nem in particular
examples.			
BIE-IMA2	Introduction to Mathematics 2	Z	2
	tend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they a	re able to apply th	nem in particular
examples.			
BIE-ST1	Network Technology 1	Z	3
	n essentials of computer networks and practice with network technologies. The course corresponds to the Cisco Netacad cu	rriculum, CCNA1	- R&S
Introduction to Network			
BIE-PKM	Preparatory Mathematics	Z	4
The purpose of Prepara	tory Mathematics is to help students revise the most important topics of high-school mathematics.		
BIE-PJV	Programming in Java	Z,ZK	4
The course Programmi	ng in Java will introduce students to the object oriented programming in Java programming language. Beside of basics of Jav	a language the fu	ndamental APIs
will also be presented,	especially data structures, files, GUI, networking, databases and concurrent APIs.		
BIE-PS2	Programming in shell 2	Z,ZK	4
Students get a general	overview of scripting languages, introduction into syntax, semantics, programming style, data structures, pros and cons. In a	dition, 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 Erasmu	s students: We ar	e ready do adapt
the lectures to provide e	even very basic Bourne shell usage. Depending on actual knowledge of the students, orientation in user filesystem tools (cp,	In, mkdir, rm) a	nd 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 se	election of advance	ed scripting
techniques used in prac	tice.		
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, an	alysis, crisis man	agement 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 knowle	dge outside IT, consider starting their own company, or have ambitions to work in middle or senior management positions in l	arge companies.	The course is
also suitable for all thos	e who will develop software or hardware in the form of team projects.		
BIE-VAK.21	Selected Combinatorics Applications	Z	3
The course aims to intro	buce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the	e 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 ba	asic data structur	es. Furthermore,
	tion of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical)		
	e solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optim	ization and more.	Students will
also try to implement so	lutions to the studied problems with a special focus on the effective use of existing tools.		
BI-SCE1	Computer Engineering Seminar I	Z	4
The Seminar of Comput	er Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance	e to failures and a	attacks. Students
are approached individu	ally within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of	he subject is wor	k with scientific
articles and other profes	ssional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tead	chers. The topics	are new for each
semester.			
TV2K1	Physical Education 2	Z	1
BIE-SEP	World Economy and Business	Z,ZK	4
The course introduces	students of technical university to the international business. It does that predominantly by comparing individual countries and	d key regions of w	orld economy.
Students get to know al	bout different religions and cultures, necessary for doing business in diverse societies as well as indexes of economic freedor	n, corruption and	economic
	needed for the right investment decision. Seminars help to improve on the knowledge in the form of discussions based on in	idividual readings	. It is advised to
take bachelor level of th	is course BIE-SEP as a prerequisite.		
BIE-3DT.1	3D Printing	KZ	4
Students learn to desig			
Cladelile iourn to acorg	n three-dimensional objects optimized for printing on a RepRap printer and the printing itself. They will be able to design obje	cts, prepare for p	rinting and print

List of courses of this pass:

Code	Name of the course	Completion	Credits
BE0B16FI1	Philosophy 1	KZ	4
We deal with the	e most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philos	ophy and connecti	on of old
	philosophical thoughts with recent problems of science, technology, economics and politics.		
BI-SCE1	Computer Engineering Seminar I	Z	4
The Seminar of Co	mputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to	, failures and attac	ks. Students
are approached in	ndividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the	subject is work wi	th scientific
articles and other p	professional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache	rs. The topics are n	ew for each
	semester.		
BIE-3DT.1	3D Printing	KZ	4
Students learn to o	design three-dimensional objects optimized for printing on a RepRap printer and the printing itself. They will be able to design objects	, prepare for printir	ng and print
	in 3D.		
BIE-AAG	Automata and Grammars	Z,ZK	6
Students are introd	uced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite	automata, regular	expressions
and regular gramm	nars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, relationships between fo	rmal languages an	d automata.
	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.
Knowledge acquii			

BIE-ADW.1	Windows Administration	Z,ZK	4
	tand the architecture and internals of the Windows OS and acquire the skills to administrate the Windows OS. They are able use the		
security tools a	nd apply advanced ActiveDirectory administration methods. They are able to solve problems by applying appropriate troubleshooting heterogeneous systems. Students are able to effectively configure centralised administration of a computer network.	methods and adm	iinistrate
BIE-AG1	Algorithms and Graphs 1	Z,ZK	6
	s the basics from the efficient algorithm design, data structures, and graph theory, belonging to the core knowledge of every computing the structures and graph theory.		1
	t BIE-AAG and BIE-ZDM courses in which the students gain the basic skills and knowledge needed for time and space complexity of a	-	
	practically the asymptotic mathematics.	-	
BIE-AG2	Algorithms and Graphs 2	Z,ZK	5
BIE-APS.1	Architectures of Computer Systems	Z,ZK	5
	in the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Spec		
1	n processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the prince	•	
	rocessors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of the elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and	-	
BIE-BAP	Bachelor Thesis	Z	14
BIE-BEK	Secure Code	Z,ZK	5
	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		-
	s gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every		-
administrator priv	rileges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing	data and the relati	onships of
	database systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and the	-	
BIE-BEZ	Security	Z,ZK	6
	In the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric a		
	b. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos roperly and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal a:		-
	security standards, social engineering, and basic principles of security management.		on ocounty,
BIE-BIG	DB Technologies for Big Data	KZ	4
Students are introc	luced into the field of Big Data. These are data that the standard relational databases cannot process efficientlydue to the size, and a	t the same time, th	eir real-time
	provide information that can have key importance for thecompetitiveness of a company or organization. The course is focused practice	•	
important profession	onaltechnologies, such as Apache Cassandra, Apache Hadoop, Apache Solr, and others. The course brings to students theoreticalfor	undation of algorith	nms used in
	Big data systems. In the labs, students learn to develop their own applications on topof these technologies.	-	0
BIE-BPR	Bachelor Project	Z	2
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 st semester. If he fulfill these tasks, the supervisor will award him / her at the end of the semester with the BI-BPR course.	ludent will perform	during the
BIE-CAO	Digital and Analog Circuits	Z,ZK	5
	i fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and	, ,	1
-	circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences betw		-
	of electronic devices.		
BIE-CCN	Compiler Construction	Z,ZK	5
	uctory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles		
	and the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching		
BIE-CZ0	Czech Language for Foreigners Course Czech for foreigners offers the basic topics of conversation: Introductions, Orientation, Shopping, Work / Study, Travel, Time	KZ Eamily	2
BIE-CZ1.21	Czech Language for Foreigners II	KZ	2
	ended for Students of English programmes who have completed BIE-CZ0 course or have basic knowledge of the Czech language. Th	1	1
basio	c vocabulary and clarifies the structure of the Czech language structure with regard to the practical needs of Students residing in the	Czech Republic.	
BIE-DBS	Database Systems	Z,ZK	6
	oduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They lear	-	
	constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the		
	lation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the funda Illing parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced t	-	
-	ases with respect to speed of access to large quantities of data. This introductory-level module does not cover: Administration of data		-
	optimizing database applications, distributed database systems, data stores.	······	00 0 0
BIE-DPR	Document., Presentation, Rhetorics	KZ	4
	d to the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create and pr		
and presenting bef	ore an audience. Students will also learn to write technical reports and scientific texts. There is no fixed schedule for BIE-DPR. A teac	her will contact yo	u before the
	start of the semester.	7 71/	-
BIE-EFA	Efficient Algorithms overview of efficient algorithms and data structures for solving classical algorithmic problems, such as searching and sorting, on dyna		5
-	to design and implement such algorithms, to use methods for analysing their computational and memory complexity. They understar		
	nplexity, special sorting algorithms with linear complexity, algorithms for associative and address searching. They are able to use the eff		
	hash tables, search trees, balanced search trees, heaps, B-trees, and others. They are able to work with recursive algorithms and dyn	-	
BIE-EHD	Introduction to European Economic History	Z,ZK	3
	uces a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global eco		-
	in history. As European countries have been dominant actors in this process it focuses predominantly on their roles in the economic	, ,	
	pire to fragmentation of the Middle Ages, from destruction of WWII to the current affairs, the development of modern financial instituti tailed economic history of particular European countries but rather the impact of trade and role of particular events, institutions and c	-	
	meetings will consist of a mixture of lecture and discussion.	- gamzauono III (115	y. 01033
BIE-EMP	Economic and management principles	КZ	4
	ned to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with	1	1
	into state economic environment (CR), management of property and capital structure, business transaction records keeping during a	-	
	between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination		

BIE-EPR	Economic project	Z	1
This course is an e	xtension of the course Introduction to European Economic History (BIE-EHD). There is no fixed schedule for BIE-EPR. A teacher will	contact you before	the start of
	the semester.		
BIE-FTR.1	Financial Markets	Z,ZK	5
	has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on		
	Internativities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities		
	nools who have sufficient knowledge ICT and mathematics, and who have at the same time an understanding of the functioning of fin se thus englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistic		
BIE-GRA		Z.ZK	5
	Graph Algorithms and Complexity Theory erview of typical usages of graph models in computing. They learn algorithmic methods of solving graph problems. They understand alg	1 ' 1	-
-	theory (flows in networks, heuristic search, approximation of complex problems). Students get basic competence in computer science		
<u>-</u>	Turing machine models and issues of NP-completeness and NP-hardness.	j,	
BIE-HMI	History of Mathematics and Informatics	Z,ZK	3
	er the methods traditionally used in mathematics and related disciplines - informatics - from different periods of the development of math		-
	acquainted with mathematical methods suitable for applications in contemporary computer science.		
BIE-HWB	Hardware Security	Z,ZK	5
The course deal	s with hardware resources used to ensure security of computer systems including embedded ones. The students become familiar wit	h the operating prin	nciples of
cryptographic mod	ules, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about ve	ulnerabilities of HW	/ resources,
including side-char	anel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tec	о, °	applications
	and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of	· · · · · · · · · · · · · · · · · · ·	
BIE-IMA	Introduction to Mathematics	Z	4
Students refresh a	nd extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a	able to apply them i	in particular
	examples.	7	
BIE-IMA2	Introduction to Mathematics 2	Z	2
Students refresh a	nd extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are a examples.	tole to apply them	in particular
BIE-KOM	Conceptual Modelling	Z,ZK	5
	s on the development of abstract thinking skills and precise specifications in the form of conceptual models. Students will learn the abi	1 1	-
	tegorize and also determine the right links in complex systems of social reality, especially enterprises and institutions. Students will leave the social reality and also determine the right links in complex systems of social reality, especially enterprises and institutions.		
	ng in OntoUML notation. They will also learn to express the rules and limitations of everyday reality using the OCL language. Students		-
	ering as a discipline enabling conceptual modeling of the structure of enterprises and institutions and their process and learn the DEM		
	also designed with regard to the continuity of software implementations.		
BIE-LIN	Linear Algebra	Z,ZK	7
Students understa	ind the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependencies	among componer	nts are only
linear. They know	v the basic methods for operating with polynomials and linear spaces. They are able to perform matrix operations and solve systems of	of linear equations.	They can
	oply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand error-detecting and error-corr	ecting codes.	
BIE-MIK	Fundamentals of Microeconomics	Z,ZK	4
	bry course of microeconomics designed for students without previous economic background. It describes different market regimes and	-	n react to
	mer demand, competitor strategies, government intervention, uncertainty and information asymmetry. All concepts are illustrated on i		
BIE-MLO	Mathematical Logic	Z,ZK	5
	An introduction to propositional and predicate logic.	774	
BIE-OOP	Object-Oriented Programming	Z,ZK	4
	programming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software develo		
course we look at	handing, refactoring and design patterns.	prinerit including te	sung, enoi
BIE-OSY	Operating Systems	Z,ZK	5
	and the classical theory of operating systems (OS) in addition to the knowledge gained in the BI-PS1 module. They get a solid knowle	I ' I	
	mentations. They understand the problems of race conditions and principles and algorithms for critical sections, thread scheduling, re-	-	-
	the techniques of managing virtual memory, principles and architectures of disks and disk arrays, file systems and peripheral devices		
-	cessary for developing system applications or for system administration. They are able to design and implement simple multithreaded		
BIE-PA1	Programming and Algorithmics 1	Z,ZK	6
	onstruct algorithms for solving basic problems and write them in the C language. They understand data types (simple, structured, point	I ' I	
functions, concep	ot of recursion. They learn the basics of algorithm complexity analysis. They know fundamental algorithms for searching, sorting, and i	manipulating with li	inked lists.
BIE-PA2	Programming and Algorithmics 2	Z,ZK	7
Students know th	e instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, c	ueue, enlargeable	array, set,
table). They can im	plement linked structures. They learn these skills using the programming language C++. Although this is not a module of programming in	n C++, students are	e introduced
	to all C++ features needed to achieve the main objective (e.g., operator overloading, templates).		
BIE-PAI	Law and Informatics	ZK	3
	wledge of fundamental protection of intangible property, overview of contractual aspects of copyright. They are able to design an approp		
protection and do	research and verification of the outputs concerning trademarks, patents, industrial design rights. They are able to participate actively	in the proceedings	to register
	intangible property. They have a good overview of the Czech Republic legislation as well as the EU legislation.	774	F
BIE-PJP Students master ba	Programming Languages and Compilers asic methods of implementation of common high-level programming languages. They get experience with the design and implementat	Z,ZK	5 moiler parts
	amming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has		
	pompiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, but	-	-
	for parsing and processing text in a language defined by a LL(1) grammar.		
BIE-PJV	Programming in Java	Z,ZK	4
	imming in Java will introduce students to the object oriented programming in Java programming language. Beside of basics of Java la		
	will also be presented, especially data structures, files, GUI, networking, databases and concurrent APIs.		
BIE-PKM	Preparatory Mathematics	Z	4
	The purpose of Preparatory Mathematics is to help students revise the most important topics of high-school mathematics.	<u>.</u>	

BIE-PPA	Programming Paradigms	Z,ZK	5
		Z,ZK	5
BIE-PRR.21	Project management		-
	urse is to introduce students into the basic concepts and principles of project management, i.e. methods of planning, teamwork, anal		
	ation, argumentation and meeting management. Students will practice project management techniques (e.g. SWOT analysis, risk as burce schedule, resource balancing, network graphs) and creation of project documentation. The course is designed especially for str		
	nowledge outside IT, consider starting their own company, or have ambitions to work in middle or senior management positions in lar		
	also suitable for all those who will develop software or hardware in the form of team projects.	ge companies. The	
		1/7	
BIE-PS1	Programming in Shell 1	KZ	5
Students understan	d the basic principles of operating systems (processes and threads, file systems, access rights, memory management, network interf		on UNIX like
	operating systems. In practically oriented exercises, they will learn to use shell, basic commands and filters for processing text		
BIE-PS2	Programming in shell 2	Z,ZK	4
	eral overview of scripting languages, introduction into syntax, semantics, programming style, data structures, pros and cons. In additi		
-	hell and some other particular scripting languages and will get practical experience with shell script programming. Note to Erasmus stu		
	vide even very basic Bourne shell usage. Depending on actual knowledge of the students, orientation in user filesystem tools (cp, ln,		
data filtering tools	s (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 sele	ection of advanced	scripting
	techniques used in practice.		
BIE-PSI	Computer Networks	Z,ZK	5
	nd the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks focusing		
of the ISO OSI mod	del. They also get a basic understanding of communication media, security, and network administration. Students will be able to write	a simple network	application
	and configure a simple network.		
BIE-PST	Probability and Statistics	Z,ZK	5
The students will lea	arn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variable	s. They will be able	e to to apply
basic models of rar	ndom variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction	on they will be able	to perform
estimations of unkn	own distributional parameters from random sample characteristics. They will also be introduced to the methods of determining the st	atistical dependen	ce of two or
	more random variables.		
BIE-SAP	Computer Structures and Architectures	Z,ZK	6
Students understa	nd basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, inpu	its, outputs, data s	torage and
transfer.	In the labs, students gain practical experience with the design and implementation of the logic of a simple processor using modern of	digital design tools.	
BIE-SCE1	Computer Engineering Seminar I	Z	4
The Seminar of Cor	nputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to	failures and attack	ks. Students
are approached inc	dividually within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of the	subject is work with	th scientific
articles and other p	rofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teacher	s. The topics are n	ew for each
	semester.		
BIE-SCE2	Computer Engineering Seminar II	Z	4
		<u> </u>	
The Seminar of Cor	nputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to		•
		failures and attack	ks. Students
are approached inc	nputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to	and attack subject is work wit	ks. Students th scientific
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BIE-TJV	Java Technology	Z,ZK	4
, ,	s to introduce the programming language Java. The student gains practical experiences for smaller enterprise application programmi	• • •	
to build the three	and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestWeb	o services, JNDI et	c.). At the
	course end is student able to create three layers enterprise application.		
BIE-TWA.1	Web Application Design	Z,ZK	5
The basic course	of web application development. Initially, the students become familiar with HTTP and its possibilities and partly with some propertie	s of language des	cribing the
structure (HTML)	and presentation of document on the Web (CSS). These skills provide the necessary basis for the development of Web applications,	which will be demo	onstrated in
modern libraries fa	cilitate the development of Web pages applications. Server side will be demonstrated on PHP technology using frameworks Symform	y 2, Doctrine 2. De	velopments
	on the client side will be demonstrated using a JavaScript language with library jQuery and possibly MV* framework Angular	JS.	
BIE-VAK.21	Selected Combinatorics Applications	Z	3
The course aims to	introduce students in an accessible form to various branches of theoretical computer science and combinatorics. In contrast to the b	asic courses, we a	pproach the
issue from applicat	ions to theory. Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduce some basic	data structures. F	urthermore,
with the active par	ticipation of students, we will focus on solving popular and easily formulated problems from various areas of (not only theoretical) info	ormatics. Areas fro	m which we
will select probler	ns to be solved will include, for example, graph theory, combinatorial and algorithmic game theory, approximation algorithms, optimiz	ation and more. St	udents will
	also try to implement solutions to the studied problems with a special focus on the effective use of existing tools.		
BIE-VWM	Searching Web and Multimedia Databases	Z,ZK	5
Students gain basic	s knowledge concerning retrieval techniques on the web, where the web environment is viewed as a large distributed and heterogenou	is data repository.	In particular,
the students wil	I understand the techniques for retrieving text and hypertext documents (the web pages). Moreover, they will be aware of similarity re	trieval methods for	cused on
	heterogenous multimedia databases (unstructured data collections, respectively).		
BIE-VZD	Data Mining	Z,ZK	4
Students are introd	uced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, multi	dimensional data v	visualization,
statistical technique	es of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships between the transformation and fundamental principles of knowledge discovery methods.	ween model bias a	nd variance,
and know the fur	ndamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic of	lata mining tools to	common
	problems (classification, regression, clustering).		
BIE-XML	XML Technology	Z,ZK	4
BIE-ZDM	Elements of Discrete Mathematics	Z,ZK	5
Students get both a	mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula appro	oximation, and tool	s for solving
	recurrent equations.		
BIE-ZMA	Elements of Calculus	Z,ZK	6
Students acquire	knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking a	ind reasoning and	are able to
use basic proof te	chniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the lir	iks between the int	tegrals and
	sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic ex	pressions.	
BIE-ZRS	Basics of Systems Control	Z,ZK	4
Optional subject E	asics of System Control is designed for anyone interested in applied computer science in bachelor studies. A brief introduction to the	field of automatic	control will
be definitely evalu	ated by our graduates in the industrial practice. Students will gain knowledge in this rapidly evolving field of great future. We will focu	s our attention par	ticularly on
control of engineer	ing and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems. We will tea	ch you description	methods of
system models, ba	sic linear dynamic systems analysis and design verification, simple PID feedback, PSD and fuzzy controllers. This is a survey course	in which students v	will learn the
methods of creating	g a description of the system model, the basic linear dynamic systems analysis and design verification and simple PID feedback, PSD	and fuzzy controlle	ers. Attention
	nsors and actuators in control loops, issues of stability in control systems, single and continuous adjustment of the controller paramet		•
industrial implen	nentation of continuous and digital controllers and PLC control. The themes of lectures are accompanied by a number of useful exam	ples and practical	industrial
	implementations.		
BIE-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
Students are introd	uced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classic	al tasks from the a	reas of state
space search, mult	i-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm	s and the neural n	etworks, will
	be presented as well.		
FI-HPZ	Humanities subject from a study abroad	Z	3
A "Humanities sub	ject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that	t is required in the	curriculum.
	The substitution is approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.		
TV2K1	Physical Education 2	Z	1
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For updated information see <u>http://bilakniha.cvut.cz/en/FF.html</u> Generated: day 2024-05-17, time 14:00.