Study plan

Name of study plan: Bachelor branch Computer Science, in English, 2015-2020 original version

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: PLÁN VZNIKL JAJO KOPIE Z UPRAVENÉHO PLÁNU BIE-TI.2015

Name of the block: Compulsory courses in the program Minimal number of credits of the block: 117 The role of the block: PP

Code of the group: BIE-PP.2015-ORIGINAL Name of the group: Compulsory Courses od Study Program Infomatics, Presented in English, Original Version Requirement credits in the group: In this group you have to gain 117 credits Requirement courses in the group: In this group you have to complete 20 courses Credits in the group: 117

Note on the group		ises group L	JC-11.2	010		
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-AAG	Automata and Grammars	Z,ZK	6	2P+2C	Z	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-TED	Electronic Documentation Design	KZ	5	2P+2C	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-UOS	Introduction to Operating System UNIX Zden k Muziká	KZ	5	2P+2C	Z	PP
BIE-PAI	Law and Informatics	ZK	3	2P	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	Z,ZK	7	2P+1R+1C	L	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-ORIGINAL Name=Compulsory Courses od Study Program Infomatics, Presented in English, Original Version

BIE-AAG Automata and Grammars	Z,ZK	6
Students are introduced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations	of finite automata, reg	ular expressions
and regular grammars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, relationships bet	ween formal language	s and automata.
Knowledge acquired through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and trans	lation, and design of c	ligital circuits.
BIE-BAP Bachelor Thesis	Z	14
BIE-PSI Computer Networks	Z,ZK	5
Students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks f	ocusing primarily the 2	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 write a simple netw	ork application
and configure a simple network.		
BIE-SAP Computer Structures and Architectures	Z,ZK	6
Students understand basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory syste	m, inputs, outputs, da	ta storage and
transfer. In the labs, students gain practical experience with the design and implementation of the logic of a simple processor using modern digi	tal design tools.	
BIE-DBS Database Systems	Z,ZK	6
Students are introduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. The	y learn to design smal	l databases
(including integrity constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience	with the SQL language	e, as well as with
is inconcication - une relational database model. They learn the principles on normalizing a relational database schema, they understand the processing controlling parallel user access to a single data source a well as recovering a database provide them a failure at They are briefly bitter.	duced to special wave	of storing data
in relational databases with respect to speed of access to large quantities of data. This introductory-level module does not cover: Administration	of database systems	debugging and
optimizing database applications, distributed database systems, data stores.	or databade by storne,	abbugging and
BIE-CAO Digital and Analog Circuits	7 7K	5
Students get the fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical model	s and principles of fun	ctionality of
transistors, gates, circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differen	ces between analog a	nd digital modes
of electronic devices.		3
BIE-TED Electronic Documentation Design	KZ	5
Students are able to create electronic documentation, namely technical reports. They learn alternatives of WYSIWYG editors and are able to pr	oduce well-formed tec	hnical reports
using configurable tools appropriate for ICT professionals. They learn the documentation of software projects, including basics of UML and docu	mentation of source c	ode.
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 thin	nking and reasoning a	nd are able to
use basic proof techniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand	the links between the	integrals and
sums of sequences. They 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 mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and form	ula approximation, and	tools for solving
recurrent equations.		
BIE-UOS Introduction to Operating System UNIX	KZ	5
Students become advanced and knowledgeable users of common operating systems: UNIX, Linux, or MS Windows. They understand the fundational systems are supported by the standard systems and the standard systems are supported by the standard systems.	mental principles of th	e operating
systems (file systems, processes and threads, access rights, memory management, network interfaces). They gain the knowledge of advanced	users, with hands-on e	xperience of the
shell, basic commands, and filters.		_
BIE-PAI Law and Informatics	ZK	3
Students have knowledge of fundamental protection of intangible property, overview of contractual aspects of copyright. They are able to design a	n appropriate contract	based copyright
protection and do research and verification of the outputs concerning trademarks, patents, industrial design rights. They are able to participate a	actively in the proceed	ings to register
	7 71/	7
BIE-LIN LINEAR Algebra		/
Students understand the medical bundation of algebra and mathematical principles of linear models of systems around us, where the dependence of the systems around us where the dependence of the systems around us and solve systems around us around	tems of linear equation	ns They can
apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand error-detecting and error-correcting co	des	is. They can
BIE-MIO Mathematical Logic	7.7K	5
An introduction to propositional and predicate logic	2,21	5
BIE-OSY Operating Systems	7 71/	5
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Students understand the classical theory of operating systems (OS) in addition to the knowledge gained in the BI-PS1 module. They get a solid	∠,∠n knowledge of OS kerr	els, processes
Students understand the classical theory of operating systems (OS) in addition to the knowledge gained in the BI-PS1 module. They get a solid and threads implementations. They understand the problems of race conditions and principles and algorithms for critical sections, thread sched	۲,۲۸ knowledge of OS kerr uling, resource allocati	nels, processes on, deadlocks.
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BIE-SI1.2	Software Engineering I	Z,ZK	5		
Students learn the methods of analysis and design of large software systems, which are typically designed and implemented in teams. Students will get acquainted with CASE tools					
using a visual modeling language UML for modeling and solving software-related problems. Students will get an overview of object-oriented analysis, design, architecture, validation,					
verification, and testing	processes. The knowledge obtained in the lectures is practiced on a team project. If enrolled for the BIE-SP1 course running in	i parallel (only sur	nmer semester),		
the students can work o	n a single more complex project and they are classified to both courses for a single project. This course does not teach the s	tudents program	ming, nor any		
particular technology, fra	amework or programming language. The students are required to have some knowledge of these to apply them on their tean	n project.			

Name of the block: Compulsory courses of the specialization Minimal number of credits of the block: 31 The role of the block: PO

Code of the group: BIE-PO-TI.2015

Name of the group: Compulsory Courses of Bachelor Branch Computer Science, Presented in English, Version 2015

Requirement credits in the group: In this group you have to gain 31 credits

Requirement courses in the group: In this group you have to complete at least 7 courses Credits in the group: 31

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-AG2	Algorithms and Graphs 2 Ond ej Suchý	Z,ZK	5	2P+2C	L	PO
BIE-APS.1	Architectures of Computer Systems	Z,ZK	5	2P+2C	Z	PO
BIE-VZD	Data Mining Daniel Vašata, Rodrigo Augusto Da Silva Alves Daniel Vašata Daniel Vašata (Gar.)	Z,ZK	4	2P+2C	Z	PO
BIE-PAI	Law and Informatics	ZK	3	2P	Z	PO
BIE-OOP	Object-Oriented Programming Filip K ikava Filip K ikava (Gar.)	Z,ZK	4	2P+2C	Z	PO
BIE-PJP	Programming Languages and Compilers	Z,ZK	5	2P+1C	L	PO
BIE-PPA	Programming Paradigms	Z,ZK	5	2P+2C	Z	PO

Characteristics of the courses of this group of Study Plan: Code=BIE-PO-TI.2015 Name=Compulsory Courses of Bachelor Branch Computer Science, Presented in English, Version 2015

BIE-PAI	Law and Informatics	ZK	3	
Students have knowled	, ge 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 resea	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. The	y have a good overview of the Czech Republic legislation as well as the EU legislation.			
BIE-AG2	Algorithms and Graphs 2	Z,ZK	5	
BIE-APS.1	Architectures of Computer Systems	Z,ZK	5	
Students will learn the o	construction 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	cessing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the p	principles of instru	ction processing	
not only in scalar proces	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	n such systems.	
BIE-VZD	Data Mining	Z,ZK	4	
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 fundamer	ntals 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-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	issing. 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 dev	elopment includin	g testing, error	
handing, refactoring and	d design patterns.			
BIE-PJP	Programming Languages and Compilers	Z,ZK	5	
Students master basic r	nethods of implementation of common high-level programming languages. They get experience with the design and implement	ntation of individu	al compiler parts	
for a simple programmi	ng language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that l	nas a certain synt	ax into a target	
form and write a compil	er based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages,	but extends to al	l other programs	
for parsing and process	ing text in a language defined by a LL(1) grammar.			
BIE-PPA	Programming Paradigms	Z,ZK	5	
Nome of the h	le als Daviané alsonamialsé			

Name of the block: Povinné ekonomické Minimal number of credits of the block: 4 The role of the block: PE

Code of the group: BIE-PP-EM.2015

Name of the group: Compulsory Economics and Management Bachelor Courses, in English, Version 2015 Requirement credits in the group: In this group you have to gain 4 credits

Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 4

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-EMP	Economic and management principles Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	КZ	4	2P+2C	Z,L	PE

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

 BIE-EMP
 Economic and management principles
 KZ
 4

 This course is aimed to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with fields: enterprise foundation, enterprise putting into state economic environment (CR), management of property and capital structure, business transaction records keeping during an accounting period, a relation between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination.
 KZ
 4

Name of the block: Compulsory elective economic-management courses Minimal number of credits of the block: 4 The role of the block: VE

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

Name of the group: Compulsory Elective Economics, and Management Courses, in English, Version 2015 Requirement credits in the group: In this group you have to gain at least 4 credits (at most 10) Requirement courses in the group: In this group you have to complete at least 1 course Credits in the group: 4

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-EPR	Economic project Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	Z	1		L	VE
BIE-FTR.1	Financial Markets Pavla Vozárová	Z,ZK	5	2P+2C	L	VE
BIE-MIK	Fundamentals of Microeconomics Tomáš Evan, Pavla Vozárová Tomáš Evan Pavla Vozárová (Gar.)	Z,ZK	4	2P+2C	L	VE
BIE-EHD	Introduction to European Economic History Tomáš Evan Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	3	2P+1C	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

This course is an extension 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 the semester. BIE-FTR.1 Financial Markets Z,ZK 5 Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on the issue of credit risk, and globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, many firms need graduate 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 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	BIE-EPR	Economic project	Z	1			
the semester. BIE-FTR.1 Financial Markets Z,ZK 5 Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on the issue of credit risk, and globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, many firms need graduate 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 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 course is an extens	ion 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			
BIE-FTR.1 Financial Markets Z,ZK 5 Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on the issue of credit risk, and globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, many firms need graduate 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 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	the semester.	he semester.					
Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on the issue of credit risk, and globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, many firms need graduate 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 englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistical tools used in this field.BIE-MIKFundamentals of MicroeconomicsZ,ZK4	BIE-FTR.1	Financial Markets	Z,ZK	5			
globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, many firms need graduate 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 englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistical tools used in this field.BIE-MIKFundamentals of MicroeconomicsZ,ZK4	Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on the issue of credit risk, and						
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 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	globalization of market a	globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, many firms need graduates					
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	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						
BIE-MIK Fundamentals of Microeconomics Z,ZK 4	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 course of microeconomics designed for students without previous economic background. It describes different market regimes and ways how firm can react to							
consumer demand, competitor strategies, government intervention, uncertainty and information asymmetry. All concepts are illustrated on real life examples.	consumer demand, com	petitor strategies, government intervention, uncertainty and information asymmetry. All concepts are illustrated on real life e	xamples.				
BIE-EHD Introduction to European Economic History Z,ZK 3	BIE-EHD	Introduction to European Economic History	Z,ZK	3			
The course introduces a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global economy through the description	The course introduces a	selection of themes from the European economic history. It gives the student basic knowledge about forming of the global e	economy through	the description			
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	of the key periods in hist	ory. As European countries have been dominant actors in this process it focuses predominantly on their roles in the econom	nic 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 institutions is deciphered. 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 organizations in history. Class							
meetings will consist of a mixture of lecture and discussion.	meetings will consist of a	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

Note on the group:

Faculty guarantees the availability of these modules.

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-HMI	History of Mathematics and Informatics Alena Šolcová Alena Šolcová Alena Šolcová (Gar.)	Z,ZK	3	2P+1C	L	VH
FI-HPZ	Humanities subject from a study abroad	Z	3	0+0	Z,L	VH
BIE-EHD	Introduction to European Economic History Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	3	2P+1C	L	VH
BE0B16FI1	Philosophy 1 Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)	KZ	4	2P+2S	Z,L	VH

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	The course introduces a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global economy through the description						
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 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 mathematics, and will thus become							
acquainted with mathematical methods suitable for applications in contemporary computer science.							
FI-HPZ	Humanities subject from a study abroad	Z	3				
A "Humanities subject t	A "Humanities subject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module that is required in the curriculum.						
The substitution is appr	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	with 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 Ji ina Scholtzová	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 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, search trees, balanced search trees, heaps, B-trees, and others. They are able to work with recursive algorithms and dynamic programming.

BIE-GRA Gra Students get an overview of t domains of graph theory (flow Turing machine models and i	aph Algorithms and Complexity Theory ypical usages of graph models in computing. They learn algorithmic methods of solving vs in networks, heuristic search, approximation of complex problems). Students get ba ssues of NP-completeness and NP-hardness.	graph problems. asic competence	They unders in computer	stand algori science ba	Z,ZK thms for the key ckground: they	5 application understand
Code of the group): BIE-11-VO.2017		/ !	0047		
Name of the grou	p: Elective vocational Courses for Bachelor Branc	n BIE-11, \	/ersion	2017		
Requirement cred	aits in the group:					
Credite in the grou	rses in the group:					
Note on the group	D: Oborové předměty všech oborů včetně BIE-TL-VO 2017	é povinných p	oředměti	ů zaměře	ení s výjimk	ou oboru
	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-KOM	Conceptual Modelling	Z,ZK	5	2P+2C	Z	V
	Robert Pergl, Marek Suchanek Robert Pergl Robert Pergl (Gar.)	7 74	5	20,20	7	
	Filip Kodýtek, Róbert Lórencz, Ji í Bu ek Ji í Bu ek Róbert Lórencz (Gar.)		5	2P+2C		V
BIE-TJV	Java Technology	Z,ZK	4	2P+2C	Z	V
BIE-VWM	Searching Web and Multimedia Databases	Z,ZK	5	2P+1C	L	V
BIE-BEK	Róbert Lórencz	Z,ZK	5	2P+2C	L	V
BIE-SI2.3	Software Engineering 2 Michal Valenta Michal Valenta (Gar.)	Z,ZK	3	2P	Z	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-SP1	Team Software Project 1 Zden k Rybola	KZ	4	2C	Z,L	V
BIE-ADU.1	Unix Administration	Z,ZK	5	2P+2C	L	V
BIE-ADW.1	Windows Administration Miroslav Prágl, Ji í Kašpar Miroslav Prágl Miroslav Prágl (Gar.)	Z,ZK	4	2P+1C	Z	V
Characteristics of the	courses of this group of Study Plan: Code=BIF-TI-VO.2017 Na	me=Flective	Vocation	nal Cours	ses for Bac	helor
Branch BIE-TI, Version	1 2017		recaller			
BIE-KOM Con	nceptual Modelling			Z	Z,ZK	5
in the domain, categorize and	evelopment of abstract thinking skills and precise specifications in the form of conceptu d also determine the right links in complex systems of social reality, especially enterpr	ises and institutio	nts will learn	n the ability s will learn t	to distinguish k he basics of or	ey concepts tological
structural modeling in OntoU	ML notation. They will also learn to express the rules and limitations of everyday realit	y using the OCL I	anguage. S	tudents will	also learn the b	basics of
Enterprise Engineering as a a also designed with regard to	discipline enabling conceptual modeling of the structure of enterprises and institutions the continuity of software implementations.	and their proces	s and learn	the DEMO r	nethodology. T	he course is
BIE-HWB Hai	rdware Security			Z	Z,ZK	5
The course deals with hardw	are resources used to ensure security of computer systems including embedded ones	s. The students be	come famili	ar with the	operating princ	iples of
including side-channel attack	s and tampering with hardware during manufacture. Students will have an overview of c	contact and contact	ctless smart	card techno	ology including	applications
and related topics for multi-fa	ctor authentication (biometrics). Students will understand the problems of effective im	plementation of c	iphers.		7 71/	4
The subject goal is to introdu	a Technology ce the programming language Java. The student gains practical experiences for small	ler enterprise app	lication prog	2 gramming. T	∠,∠n This subject pre	4 sents how
to build the three and more la	ayers enterprise systems. The student practically exercises all communication interface	es for each layers	(JDBC, Re	stWeb servi	ces, JNDI etc.)	. At the
BIF-VWM Set	create three layers enterprise application. arching Web and Multimedia Databases			7	7 7K	5
Students gain basic knowledg	ge concerning retrieval techniques on the web, where the web environment is viewed a	is a large distribut	ed and hete	rogenous d	ata repository. I	n particular,
the students will understand heterogenous multimedia dat	the techniques for retrieving text and hypertext documents (the web pages). Moreover tabases (unstructured data collections, respectively)	, they will be awa	re of similar	ity retrieval	methods focus	ed on
BIE-BEK See	cure Code			Z	Z,ZK	5
The students will learn how to	assess security risks and how to take them into account in the design phase of their o	wn code and solu	tions. After o	getting famil	iar with the thre	at modeling
administrator privileges. Dan	gers inherent in buffer overflows will be practically demonstrated. Students will be intro	oduced to the prin	ciples of se	curing data	and the relation	nships of
security and database system	ns, web, remote procedure calls, and sockets in general. The module concludes with I	Denial of Service	attacks and	the defense	e against them.	
Sol Students will learn to work me	tware Engineering 2 sthodically with respect to software development methodic, especially Unified Process m	nethodic and Unifie	ed Modeling	Language (ב, ∠ ו <i>ג</i> [UML). They will	3 understand
the functions of individual role	es in a typical software team, as well as get a practical experience with them in the co	ncurrent BIE-SP2	2 module. St	udents will	also get an idea	a about
BIE-SSB	ng sottware quality. This knowledge will get extended with a practical experience than stem and Network Security.	ks to the concurre	ently running	g BIE-SP2 r	nodule.	5
The students will understand	the public key infrastructure (PKI), its strengths and weaknesses, its vulnerabilities ag	gainstattacks. The	students w	z ا ill also unde	erstand the ana	lysis of
network protocols from the period	erspectives of: authentication and authorisation, key exchange, and encryption. They g	et an overview of	the security	/ mechanisr	ns of operating	systems
media and networks. The stu	dents will also understand security of the networking infrastructure and its protocols a	ndwill be able to o	design and i	mplement a	secured and s	survivable
network. Students will also ge	et an overview of securing data in clouds, database systems, and servers.					

BIE-SP1	Team Software Project 1	KZ	4		
In this course, students	n this course, students work on a complex team project applying all the knowledge obtained in the BIE-SI1.2 course. There are no lectures and no seminars/tutorials in this course				
This course is to be enr	olled in parallel with BIE-SI1.2 course.				
BIE-ADU.1	Unix Administration	Z,ZK	5		
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 administration and					
security tools and apply advanced ActiveDirectory administration methods. They are able to solve problems by applying appropriate troubleshooting methods and administrate					
heterogeneous systems. Students are able to effectively configure centralised administration of a computer network.					

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 Hana Kubátová (Gar.)	Z	4	2C	Z	V
BIE-SCE2	Computer Engineering Seminar II Hana Kubátová 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 Alexandru Moucha Alexandru Moucha (Gar.)	Z	3	2C	Z	V
BIE-OOP	Object-Oriented Programming Filip K ikava Filip K ikava Filip K ikava (Gar.)	Z,ZK	4	2P+2C	Z	V
BIE-PKM	Preparatory Mathematics 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 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,Z	V
BIE-SEP	World Economy and Business Tomáš Evan Tomáš Evan (Gar.)	Z,ZK	4	2P+2C	Z	V

Characteristics of the courses of this group of Study Plan: Code=BIE-V.2017 Name=Purely Elective Bachelor Courses, Version 2017

 BIE-OOP
 Object-Oriented Programming
 Z,ZK
 4

 Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate together by message passing. In this course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software development including testing, error handing, refactoring and design patterns.
 BIE-FTR.1
 Financial Markets
 Z,ZK
 5

 Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on the issue of credit risk, and globalization of market activities. The need to use and properly apply mathematical and technical tools is emphasized. To manage their financial activities, 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 englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistical tools used in this field.

שב-בחט	Introduction to European Economic History	Z,ZK	3			
The course introduces	a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global	economy 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 econon	nic 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 institutions is deciphered. The course						
does not cover detailed	economic history of particular European countries but rather the impact of trade and role of particular events, institutions an	d organizations in	history. Class			
meetings will consist of	a mixture of lecture and discussion.					
BIE-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4			
Students are introduced	to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the cla	ssical tasks from t	he areas of state			
space search, multi-age	ent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algor	ithms and the neu	ral networks, will			
be presented as well.						
BIE-ZRS	Basics of Systems Control	Z,ZK	4			
Optional subject Basics	or System Control is designed for anyone interested in applied computer science in bachelor studies. A brief introduction to	the field of autom	atic control will			
be definitely evaluated	by our graduates in the industrial practice. Students will gain knowledge in this rapidly evolving field of great ruture, we will for a dayling and average Ma will provide basis information form the faddhakk castel of linear dramatical form. We will be a dayling with the faddhakk castel of the straight based on the straight	cus our attention	tion mothodo of			
control of engineering a	Ind physical systems, we will provide basic mormation from the recoract control of interal dynamical SISO systems, we will provide basic mormation from the recoract control of interal dynamical SISO systems, we will provide basic mormation from the recoract control of the dynamical SISO systems, we will provide basic mormation from the recoract control of the dynamical SISO systems, we will provide basic mormation from the recoract control of the dynamical SISO systems, we will provide basic mormation from the recoract control of the dynamical SISO systems, we will provide basic mormation of the dynamical systems and dynamical systems are dynamical systems.	reach you descrip	ato will loorn the			
mothods of croating a d	ted uynamic systems analysis and design vermication, simple FD reductor, FD and fuzzy controllers. This is a survey cou	SD and fuzzy con				
is also given to sensors	sociation of the system induct, the basic interact dynamic systems analysis and design vernication and simpler in breducation, in a subscription of the controllar para	meters and certain	n aspects of the			
industrial implementation	in of continuous and digital controllers and PI C control. The themes of lectures are accompanied by a number of useful examples of the control of the contr	mples and practica	al industrial			
implementations.						
BIE-CCN	Compiler Construction	7 7K	5			
This is an introductory of	compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principle	s of compilers for	students to			
understand the design	and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching theme	e of the class.				
BIE-SCE1	Computer Engineering Seminar	7	4			
The Seminar of Compu	er Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistan	ce to failures and a	attacks. Students			
are approached individ	ally within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of	the subject is wor	k with scientific			
articles and other profe	ssional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tea	chers. The topics	are new for each			
semester.						
BIE-SCE2	Computer Engineering Seminar II	Z	4			
The Seminar of Compu	in Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistan	ce to failures and a	attacks. Students			
are approached individ	ally within the subject. Each student or group of students solves some interesting topic with the selected supervisor. Part of	the subject is wor	k with scientific			
articles and other profe	ssional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar tea	chers. The topics	are new for each			
semester.						
BIE-CZ0	Czech Language for Foreigners	KZ	2			
Course Czech for foreig	ners offers the basic topics of conversation: Introductions, Orientation, Shopping, Work / Study, Travel, Time, Family.	1	I			
DIE 071-01	Czech Language for Eoreigners II	K7	2			
	Ozech Language for Foreigners in		<u> </u>			
The course is intended	for Students of English programmes who have completed BIE-CZ0 course or have basic knowledge of the Czech language.	The course furthe	er expands the			
The course is intended basic vocabulary and c	for Students of English programmes who have completed BIE-CZ0 course or have basic knowledge of the Czech language. arifies the structure of the Czech language structure with regard to the practical needs of Students residing in the Czech Re	The course furthe public.	er expands the			
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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 resistand	ce to failures and	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	the 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 tea	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 key regions of world economy.					
Students get to know at	bout different religions and cultures, necessary for doing business in diverse societies as well as indexes of economic freedo	m, corruption and	economic		

development, which are needed for the right investment decision. Seminars help to improve on the knowledge in the form of discussions based on individual readings. It is advised to take bachelor level of this course BIE-SEP as a prerequisite.

List of courses of this pass:

Code	Name of the course	Completion	Credits
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 philos	sophy and connect	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 Cor	nputer Engineering is a (s)elective course for students who want to deal with deeper topics of digital design, reliability and resistance to	, b failures and attac	ks. Students
are approached in	dividually 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	rofessional literature and/or work in K N laboratories. The capacity of the subject is limited by the possibilities of the seminar teache semester.	rs. The topics are r	ew for each
BIE-AAG	Automata and Grammars	7.7K	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	ars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, relationships between fo	rmal languages an	d automata.
Knowledge acquir	ed 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-ADU.1	Unix Administration	Z.ZK	5
BIF-ADW 1	Windows Administration	7.7K	4
Students underst	and the architecture and internals of the Windows OS and acculate the skills to administrate the Windows OS. They are able use the	standard administ	ation and
security tools a	nd apply advanced ActiveDirectory administration methods. They are able to solve problems by applying appropriate troubleshooting	methods and adm	inistrate
	heterogeneous systems. Students are able to effectively configure centralised administration of a computer network.		
BIE-AG2	Algorithms and Graphs 2	Z.ZK	5
BIE-APS.1	Architectures of Computer Systems	7.7K	5
Students will lear	n the construction principles of internal architecture of computers with universal processors at the level of machine instructions. Spe	cial emphasis is giv	/en on the
pipelined instruction	processing and on the memory hierarchy. Students will understand the basic concepts of RISC and CISC architectures and the prin	ciples of instruction	processing
not only in scalar pr	ocessors, but also in superscalar processors that can execute multiple instructions in one cycle, while ensuring the correctness of the	sequential model of	of programs.
The course further	elaborates the principles and architectures of shared memory multiprocessor and multicore systems and the memory coherence and	d consistency in su	ch systems.
BIE-BAP	Bachelor Thesis	Z	14
BIE-BEK	Secure Code	7.7K	5
The students will le	arn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting fi	amiliar with the thre	at modeling
theory, students	gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every	program needs to	run with
administrator priv	leges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing	data and the relati	onships of
security and	database systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and the	ne defense against	them.
BIE-BEZ	Security	Z,ZK	6
Students understan	d the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric	and asymmetric cry	ptosystems,
and hash functions	They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos	systems for comput	er systems.
They are able to p	operly and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal a	spects of informati	on security,
	security standards, social engineering, and basic principles of security management.		
BIE-CAO	Digital and Analog Circuits	Z,ZK	5
Students get the	fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and	principles of funct	ionality of
transistors, gates, c	ircuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences between the termination of the differences between the termination of the differences between the	veen analog and d	igital modes
	of electronic devices.	I	
BIE-CCN	Compiler Construction	Z,ZK	5
This is an introdu	ictory class on compiler construction for bachelor students in computer science. The goal of the class is to introduce basic principles	of compilers for st	udents to
understa	nd the design and implementation of programming languages. Seeing and actually understanding self-compilation is the overarching	theme of the clas	s.
BIE-CZ0	Czech Language for Foreigners	KZ	2
	Course Czech for foreigners offers the basic topics of conversation: Introductions, Orientation, Shopping, Work / Study, Travel, Tim	e, Family.	1
BIE-CZ1.21	Czech Language for Foreigners II	KZ	2
The course is inte	nded for Students of English programmes who have completed BIE-CZ0 course or have basic knowledge of the Czech language. The	e course further ex	kpands the
basic	vocabulary and clarifies the structure of the Czech language structure with regard to the practical needs of Students residing in the	Czech Republic.	1
BIE-DBS	Database Systems	Z,ZK	6
Students are intro	oduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They lear	n to design small o	latabases
(including integrity	constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the	SQL language, as	well as with
its theoretical found	ation - the relational database model. They learn the principles of normalizing a relational database schema. They understand the funda	imental concepts o	r transaction
processing, control	ling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced	to special ways of	storing data

in relational databases with respect to speed of access to large quantities of data. This introductory-level module does not cover: Administration of database systems, debugging and optimizing database applications, distributed database systems, data stores.

	optimizing database applications, distributed database systems, data stores.		
BIE-EFA	Efficient Algorithms	Z,ZK	5
Students get an o	overview of efficient algorithms and data structures for solving classical algorithmic problems, such as searching and sorting, on dyna	amically changing o	data sets.
O(n log n) time com	to design and implement such algorithms, to use methods for analysing their computational and memory complexity. I hey understar nevity special sorting algorithms with linear complexity algorithms for associative and address searching. They are able to use the eff	id the sorting algor	rithms with
such as h	ash tables, search trees, balanced search trees, heaps, B-trees, and others. They are able to work with recursive algorithms and dyr	namic programming	g.
BIE-EHD	Introduction to European Economic History	Z,ZK	3
The course introdu	ices a selection of themes from the European economic history. It gives the student basic knowledge about forming of the global eco	nomy through the	description
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 Emp	bire to fragmentation of the Middle Ages, from destruction of WWII to the current affairs, the development of modern financial institution and the second se	ons is deciphered.	The course
does not cover de	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	organizations in his	tory. Class
BIE-EMP	Economic and management principles	K7	1
This course is aim	ned to fundamental problems of business economy. The course makes students familiar with a life cycle of business, specifically with	fields: enterprise fo	oundation.
enterprise putting in	nto state economic environment (CR), management of property and capital structure, business transaction records keeping during a	n accounting period	d, a relation
	between business production and costs, evaluation of enterprise financial health and business rehabilitation or termination	L.	
BIE-EPR	Economic project	Z	1
This course is an ex	tension 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
Financial sector I	has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view on that activities. The need to use and properly apply mathematical and technical teals is emphasized. To manage their financial activities	the issue of credit	risk, and
from technical sch	cols who have sufficient knowledge ICT and mathematics, and who have at the same time an understanding of the functioning of fin	ancial markets The	e Financial
Markets course	e thus englobes both a description of financial markets and related economic theories, and an overview of mathematical and statistic	cal tools used in thi	is field.
BIE-GRA	Graph Algorithms and Complexity Theory	Z,ZK	5
Students get an ove	rview of typical usages of graph models in computing. They learn algorithmic methods of solving graph problems. They understand alg	orithms for the key	application
domains of graph th	neory (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.		
BIE-HMI	History of Mathematics and Informatics	Z,ZK	3
Students will maste	r the methods traditionally used in mathematics and related disciplines - mornalics - normalice in periods of the development of matr acquisited with mathematical methods suitable for applications in contemporary computer science	iematics, and will tr	nus become
BIE-HWB	Hardware Security	7 7K	5
The course deals	with hardware resources used to ensure security of computer systems including embedded ones. The students become familiar wit	h the operating pri	nciples of
on into graphia madu			
cryptographic modu	iles, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vi	ulnerabilities of HW	/ resources,
including side-chan	iles, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vi nel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tec	ulnerabilities of HW chnology including a	/ resources, applications
including side-chan	iles, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vi nel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tec and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of	ulnerabilities of HW chnology including a ciphers.	/ resources, applications
including side-chan	Iles, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vi nel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card tec and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of Introduction to Mathematics	ulnerabilities of HW chnology including a ciphers.	/ resources, applications 4
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	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	queue, 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 i	n C++, students are	e introduced
	to all C++ teatures needed to achieve the main objective (e.g., operator overloading, templates).		
BIE-PAI	Law and Informatics	ZK	3
Students have know	wledge of fundamental protection of intangible property, overview of contractual aspects of copyright. They are able to design an appropriate the second s	priate contract-base	ed copyright
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
		774	
BIE-PJP	Programming Languages and Compilers	Z,ZK	5 mailer aerte
for a simple progr	asic methods of implementation of common high-level programming languages. They get experience with the design and implementation	tion of individual col	mplier parts
form and write a co	amining language, data types, subjournes, and data abstractions. Students are able to formany specify a translation of a text that has	t ovtonde to all othe	
	for parsing and processing text in a language defined by a LL (1) grammar		er programs
BIE-P IV	Programming in Java	7 7K	4
The course Progra	i in the second s	anguage the fundar	nental APIs
	will also be presented, especially data structures, files, GUI, networking, databases and concurrent APIs.		
BIF-PKM	Preparatory Mathematics	7	4
	The purpose of Preparatory Mathematics is to help students revise the most important topics of high-school mathematics	· – ·	•
BIE-PPA	Programming Paradigms	Z.ZK	5
BIF-PRR 21	Project management	7.7K	5
The aim of the co	burse is to introduce students into the basic concepts and principles of project management, i.e. methods of planning, teamwork, ana	Ivsis. crisis manage	ement in a
project, communi	cation, argumentation and meeting management. Students will practice project management techniques (e.g. SWOT analysis, risk as	ssessment and mar	nagement,
Gantt charts, res	ource schedule, resource balancing, network graphs) and creation of project documentation. The course is designed especially for st	udents who are inte	erested in
deepening their k	nowledge outside IT, consider starting their own company, or have ambitions to work in middle or senior management positions in lar	rge 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	4
Students get a ger	neral overview of scripting languages, introduction into syntax, semantics, programming style, data structures, pros and cons. In addit	ion, they gain a de	eper insight
into Bourne Again	shell and some other particular scripting languages and will get practical experience with shell script programming. Note to Erasmus st	udents: We are rea	dy do adapt
the lectures to pro	wide even very basic Bourne shell usage. Depending on actual knowledge of the students, orientation in user filesystem tools (cp, In,	mkdir, rm) and u	seful basic
data filtering too	Is (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 sel	lection of advanced	scripting
	techniques used in practice.		
BIE-PSI	Computer Networks	Z,ZK	5
Students understa	and the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks focusing	g primarily the 2nd i	to 4th layer
	and configure a simple network	e a simple network	application
	and conligate a simple network.		
BIE DOT	Drobability and Statistics	774	5
BIE-PST	Probability and Statistics		5 to to apply
BIE-PST The students will le	Probability and Statistics earn the basics of probabilistic thinking, the ability to synthesize prior and posterior information and learn to work with random variable indom variable distributions and solve applied probabilistic problems in informatics and computer science. Using the statistical induction	Z,ZK es. They will be able	5 to to apply
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BIE-SSB	System and Network Security	Z,ZK	5		
The students wil	l understand the public key infrastructure (PKI), its strengths and weaknesses, its vulnerabilities againstattacks. The students will also	o understand the a	nalysis of		
network protocols from the perspectives of: authentication and authorisation, key exchange, and encryption. They get an overview of the security mechanisms of operating systems					
(OSs), of the ways virtualization canbe used to protect OSs, and of the security mechanisms for the OS memory. The students will learn basic methods of forensic analysis fstorage					
media and netwo	ks. The students will also understand security of the networking infrastructure and its protocols and will be able to design and implem	ent a secured and	survivable		
	network. Students will also get an overview of securing data in clouds, database systems, and servers.	-	0		
BIE-ST1	Network lechnology 1		3		
The course is to	sused on essentials of computer networks and practice with network technologies. Ine course corresponds to the Cisco Netacad cur	riculum, CCNA1 - I	K&S		
		1/7			
BIE-TED	Electronic Documentation Design	KZ	5		
Students are able	to create electronic documentation, namely technical reports. They learn alternatives of WYSIWYG editors and are able to produce	well-formed technic	cal reports		
	rable tools appropriate for ICT professionals. They learn the documentation of software projects, including basics of UNL and docum	ientation of source	code.		
BIE-IJV	Java lechnology	_ Z,ZK	4		
The subject goal is	s to introduce the programming language Java. The student gains practical experiences for smaller enterprise application programming	ng. This subject pre			
to build the three	and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, Restweet	services, JNDI et	c.). At the		
		V7	F		
DIE-UUS Students bosom	e advanced and knowledgeable users of common exercising systems UNIX	NZ	O oporating		
systems (file system	e avanced and knowledgeable users of common operating systems. ONLY, Linux, of this windows, a mer understand the fundament	ith hands on ovnor	ionco of tho		
Systems (me system	shell basic commands and filters	in nanus-on exper			
BIE-VAK 21	Selected Combinatorics Applications	7	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	onroach the		
issue from applicat	inst to theory Together, we will first refresh the basic knowledge needed to design and analyze algorithms and introduces some basic	data structures F	urthermore		
with the active par	icipation of students, we will focus on solving bogular and easily formulated problems from various areas of (not only theoretical) info	ormatics. Areas from	n 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. Stu	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 basi	knowledge concerning retrieval techniques on the web, where the web environment is viewed as a large distributed and heterogenou	is data repository. I	n 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	used 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	sualization,		
statistical technique	es of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships betw	ween model bias ar	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 d	lata mining tools to	common		
	problems (classification, regression, clustering).				
BIE-ZDM	Elements of Discrete Mathematics	Z,ZK	5		
Students get both a	a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula appre	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	egrals 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	e 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 part	icularly on		
control of enginee	ring and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems. We will tear	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	vill 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	rs. Attention		
is also given to ser	isors and actuators in control loops, issues of stability in control systems, single and continuous adjustment of the controller paramet	ers and certain as	bects of the		
industrial impler	implementations	ipies and practical	nuusinai		
	Artificial Intelligence Fundamentale	7.71	1		
Students are introd	Annotal memory and the fundamental problems in the Artificial Intelligence and the basic methods for their solving. It focuses mainly on the classic	∠,∠r\ al tasks from the ar	+ A a cost of state		
snace search mult	i-agent systems, name theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm	is and the neural ne	tworke will		
space course, mun	be presented as well.				
FI-HP7	Humanities subject from a study abroad	7	3		
A "Humanities sub	jiect 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.				
T\/2K1	Physical Education 2	7	1		

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