Study plan

Name of study plan: Computer Science, Presented in English, Version 2012

Faculty/Institute/Others:

Department: Department of Theoretical Computer Science

Branch of study guaranteed by the department: Computer Science

Garantor of the study branch: doc. Ing. Jan Janoušek, Ph.D.

Program of study: Informatics Type of study: Bachelor full-time

Required credits: 177
Elective courses credits: 3
Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 121

The role of the block: PP

Code of the group: BIE-PP.2

Name of the group: Compulsory Courses of Study Program Infomatics, Presented in English

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 at least 20 courses

Credits in the group: 117 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-AAG	Automata and Grammars Jan Trávníček, Jan Holub, Jan Janoušek Radomír Polách Jan Holub (Gar.)	Z,ZK	6	2+2	Z	PP
BIE-BAP	Bachelor Theses Miroslav Balík Miroslav Balík (Gar.)	Z	14	0+0	L,Z	PP
BIE-PSI	Computer Networks	Z,ZK	5	2+2	L	PP
BIE-SAP	Computer Structures and Architectures	Z,ZK	6	2+3	L	PP
BIE-DBS	Database Systems Michal Valenta, Josef Pavlíček Miroslav Balík Michal Valenta (Gar.)	Z,ZK	6	2+3	Z,L	PP
BIE-CAO	Digital and Analog Circuits Kateřina Hyniová Miroslav Balík Kateřina Hyniová (Gar.)	Z,ZK	5	2+2	Z	PP
BIE-TED	Electronic Documentation Design Ondřej Guth	KZ	5	2+2	L	PP
BIE-ZMA	Elements of Calculus Antonella Marchesiello Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	6	3+2	Z	PP
BIE-ZDM	Elements of Discrete Mathematics Josef Kolář Miroslav Balík Josef Kolář (Gar.)	Z,ZK	5	2+2	Z	PP
BIE-UOS	Introduction to Operating System UNIX Jan Žďárek	KZ	5	2+2	Z	PP
BIE-PAI	Law and Informatics Zdeněk Kučera Miroslav Balík Zdeněk Kučera (Gar.)	ZK	3	2+0	Z	PP
BIE-LIN	Linear Algebra	Z,ZK	7	4+2	L	PP
BIE-MLO	Mathematical Logic Kateřina Trlifajová Kateřina Trlifajová (Gar.)	Z,ZK	5	2+1	Z	PP
BIE-OSY	Operating Systems	Z,ZK	5	2+1	L	PP
BIE-PST	Probability and Statistics Petr Novák Rudolf Bohumil Blažek (Gar.)	Z,ZK	5	2+2	Z	PP
BIE-PA1	Programming and Algorithmics 1 Jan Trávníček, Miroslav Balik, Ladislav Vagner, Josef Vogel, Ondřej Guth Jan Trávníček Ladislav Vagner (Gar.)	Z,ZK	6	2+2+2	Z	PP
BIE-PA2	Programming and Algorithmics 2 Jan Trávníček	Z,ZK	7	2+2	L	PP
BIE-PPR	Project, Presentation and Rhetorics (BIE-PPR) Dana Vynikarová Dana Vynikarová (Gar.)	KZ	5	2+1	Z	PP

BIE-BEZ	Security	Z,ZK	6	2+2	L	PP
BIE-SI1.2	Software Engineering I Zdeněk Rybola Zdeněk Rybola Zdeněk Rybola (Gar.)	Z,ZK	5	2+1	Z,L	PP
havaataviatiaa af th		· · · · · · · · · · · · · · · · · · ·	,	of Chudy I	Droarom	Infomatic
resented in Englis	ne courses of this group of Study Plan: Code=BIE-PP.2 Name=C n	ompulsory C	ourses	or Study I	Program	imomatic
IE-AAG A	utomata and Grammars			Z	Z,ZK	6
	basic theoretical and implementation principles of the following topics: construction, us				_	
	nslation finite automata, construction and use of pushdown automata, hierarchy of forma gh the module is applicable in designs of algorithms for searching in text, data compres		-			
	achelor Theses				Z	14
	computer Networks			Z	Z,ZK	5
	asic common techniques, protocols, technologies, and algorithms necessary to commu					
f the ISO OSI model. The nd configure a simple net	y also get a basic understanding of communication media, security, and network admir work.	istration. Students	s will be abl	e to write a s	simple netw	ork applicatio
	computer Structures and Architectures			Z	Z,ZK	6
1	digital computer units and their structures, functions, and hardware implementation: A	_U, control unit, m	emory syst	em, inputs, c	outputs, data	a storage and
	nts gain practical experience with the design and implementation of the logic of a simple	processor using	modern dig			
	atabase Systems the database engine architecture and typical user roles. They are briefly introduced to	various database	madala Th		Z,ZK	6
	ints) using a conceptual model and implement them in a relational database engine. The			•	•	
	e relational database model. They learn the principles of normalizing a relational database		•			
•	allel user access to a single data source, as well as recovering a database engine from	•				•
	n respect to speed of access to large quantities of data. This introductory-level module	does not cover: A	dministratio	n of databas	e systems,	debugging ar
	ations, distributed database systems, data stores.			1 7	Z.ZK	5
	iigital and Analog Circuits ntal understanding of technologies underlying electronic digital systems. They understa	nd the basic theor	etical mode	- 1	, ,	_
-	and conductors. They are able to design simple circuits and evaluate circuit parameters			-	-	-
f electronic devices.						
	lectronic Documentation Design				KZ	5
	e electronic documentation, namely technical reports. They learn alternatives of WYSIV propriate for ICT professionals. They learn the documentation of software projects, inc					
	lements of Calculus	duling basics of o	IVIL ATIU UUC		Z.ZK	6
	ge and understanding of the fundamentals of classical calculus so that they are able to	apply mathematic	al way of th	ı	, ,	
se basic proof techniques	s. They get skills to practically handle functions of one variable in solving the problems i	n informatics. The	y understar	nd the links b	etween the	integrals and
ums of sequences. They	are able to estimate lower or upper bounds of values of real functions and to handle sir	nple asymptotic e	xpressions.			
	lements of Discrete Mathematics				Z,ZK	5
students get both a mathe	matical sound background, but also practical calculation skills in the area of combinatori	cs, value estimation	on and form	uia approxim	nation, and i	toois for solvii
ecurrent equations						
<u> </u>	ntroduction to Operating System UNIX				KZ	5
BIE-UOS Ir	ntroduction to Operating System UNIX and knowledgeable users of common operating systems: UNIX, Linux, or MS Window			lamental prir	nciples of th	e operating
BIE-UOS Ir students become advance systems (file systems, production)	ed and knowledgeable users of common operating systems: UNIX, Linux, or MS Window cesses and threads, access rights, memory management, network interfaces). They gai			lamental prir	nciples of th	e operating
BIE-UOS Irr students become advance ystems (file systems, prod hell, basic commands, an	ed and knowledgeable users of common operating systems: UNIX, Linux, or MS Window cesses and threads, access rights, memory management, network interfaces). They gaid d filters.			lamental prir users, with h	nciples of th	e operating operience of the
BIE-UOS Irr Students become advance ystems (file systems, production), and hell, basic commands, and BIE-PAI L	ed and knowledgeable users of common operating systems: UNIX, Linux, or MS Window cesses and threads, access rights, memory management, network interfaces). They gain at filters.	n the knowledge o	f advanced	lamental prir users, with h	nciples of th	e operating sperience of the
BIE-UOS Irr Students become advance ystems (file systems, production of the line of the li	ed and knowledgeable users of common operating systems: UNIX, Linux, or MS Window cesses and threads, access rights, memory management, network interfaces). They gaid d filters.	n the knowledge o	f advanced e to design a	lamental prir users, with h	nciples of the nands-on ex	e operating experience of the state of the s
BIE-UOS Ir Students become advance systems (file systems, production), and BIE-PAI L Students have knowledge or protection and do research	ed and knowledgeable users of common operating systems: UNIX, Linux, or MS Window cesses and threads, access rights, memory management, network interfaces). They gain at filters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyr	n the knowledge o	f advanced e to design a	lamental prir users, with h	nciples of the nands-on ex	e operating experience of the state of the s
BIE-UOS Ir Students become advance systems (file systems, production, production, production) shell, basic commands, and BIE-PAI Lottedents have knowledged a protection and do research thangible property. They have	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyres and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. inear Algebra	n the knowledge o	of advanced to design a participate	lamental prinusers, with han appropriate actively in the	ZK te contract-te proceeding	e operating experience of the special state of the
BIE-UOS Irr students become advance systems (file systems, production production) BIE-PAI Letudents have knowledge or rotection and do research attangible property. They have been supported to the students understand the test	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyres and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. inear Algebra neoretical foundation of algebra and mathematical principles of linear models of system	ight. They are able They are able to s around us, when	e to design a participate	lamental prir users, with han appropriat actively in the	ZK te contract-te proceeding. Z/ZK ong compo	e operating experience of to a special
BIE-UOS Irr students become advance systems (file systems, production of the library of the libr	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyres and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. inear Algebra neoretical foundation of algebra and mathematical principles of linear models of systems or methods for operating with polynomials and linear spaces. They are able to perform the	ight. They are able They are able to s around us, when	e to design a participate	lamental prir users, with han appropriat actively in the Zandencies amystems of line	ZK te contract-te proceeding. Z/ZK ong compo	e operating experience of the special
BIE-UOS Irr students become advance systems (file systems, proceed) bell, basic commands, and BIE-PAI Letudents have knowledge or to tection and do research attangible property. They have the students understand the treat. They know the basic pply these mathematical	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. inear Algebra neoretical foundation of algebra and mathematical principles of linear models of systems or methods for operating with polynomials and linear spaces. They are able to perform a principles to solving problems in 2D or 3D analytic geometry. They understand error-design and the contraction of the property of the property of the property of the property.	ight. They are able They are able to s around us, when	e to design a participate	amental prir users, with han appropriat actively in the Zondencies amystems of line odes.	ZK te contract-te proceeding Z/ZK ong compoear equation	e operating experience of to a special
BIE-UOS Irr Students become advance ystems (file systems, production of the library of the libra	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyres and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. inear Algebra neoretical foundation of algebra and mathematical principles of linear models of systems or methods for operating with polynomials and linear spaces. They are able to perform the	ight. They are able . They are able to s around us, when natrix operations a tecting and error-o	e to design a participate	amental prir users, with han appropriat actively in the Zondencies amystems of line odes.	ZK te contract-te proceeding. Z/ZK ong compo	a operating experience of the state of the s
BIE-UOS Irr Students become advance systems (file systems, procedure) Hell, basic commands, and BIE-PAI Leptudents have knowledge to trotection and do research trangible property. They have the sudents understand the trender. They know the basic populy these mathematical BIE-MLO Man introduction to predicate the systems of the students and the statement of the search of the sea	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Innear Algebra Theoretical foundation of algebra and mathematical principles of linear models of systems of methods for operating with polynomials and linear spaces. They are able to perform reprinciples to solving problems in 2D or 3D analytic geometry. They understand error-delathematical Logic te logic, the standard language and deductive system of mathematics and computer science.	ight. They are able. They are able to s around us, when the atrix operations a tecting and error-cence.	e to design a participate re the dependent solve sycorrecting c	an appropriat actively in the zero odes.	ZK le contract-te proceeding compo compo compo car equation	a operating experience of the special
BIE-UOS Irr Students become advance systems (file systems, proceed to the systems), proceed to the systems of t	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyrunal and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Innear Algebra Recordical foundation of algebra and mathematical principles of linear models of systems or methods for operating with polynomials and linear spaces. They are able to perform reprinciples to solving problems in 2D or 3D analytic geometry. They understand error-delathematical Logic The standard language and deductive system of mathematics and computer scipperating Systems Contact the standard language and deductive system of mathematics and computer scipperating Systems Contact the standard language and deductive system of mathematics and computer scipperating Systems	ight. They are able. They are able to s around us, when hatrix operations a tecting and error-cence.	e to design a participate re the dependent solve sycorrecting correcting corrections and corrections are consistent with the correction of the correction o	an appropriat actively in the zero dencies am zero des.	ZK te contract-te proceeding compo compo compo compo correct, ZK c of OS kerr	a operating sperience of the sperience o
BIE-UOS Irr Students become advance systems (file systems, proceed to the systems), proceed to the systems of t	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Innear Algebra Theoretical foundation of algebra and mathematical principles of linear models of systems are memorated principles to solving problems in 2D or 3D analytic geometry. They understand error-delathematical Logic The standard language and deductive system of mathematics and computer scipperating Systems Contact the standard language and deductive system of mathematics and computer scipperating Systems Contact theory of operating systems (OS) in addition to the knowledge gained in the Blens. They understand the problems of race conditions and principles and algorithms for	ight. They are able. They are able to saround us, when the atrix operations a tecting and error-cence. UOS module. The critical sections, the same and the same are also same are at the same	e to design a participate re the dependent solve sycorrecting correcting correcting corrections and solve sycorrecting correcting correcting corrections are solved	an appropriat actively in the zero dencies am zero des.	ZK te contract-te proceeding compo	a operating sperience of the sperience o
Itudents become advance ystems (file systems, prochell, basic commands, and Itudents have knowledge rotection and do research tangible property. They have the basic polythese mathematical ITE-MLO M. In introduction to predicate the grand the condition of threads implementation they understand the technical stream of the st	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyrunal and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Innear Algebra Recordical foundation of algebra and mathematical principles of linear models of systems or methods for operating with polynomials and linear spaces. They are able to perform reprinciples to solving problems in 2D or 3D analytic geometry. They understand error-delathematical Logic The standard language and deductive system of mathematics and computer scipperating Systems Contact the standard language and deductive system of mathematics and computer scipperating Systems Contact the standard language and deductive system of mathematics and computer scipperating Systems	ight. They are able. They are able to s around us, when natrix operations a tecting and error-opence. UOS module. The critical sections, ties, file systems and	e to design a participate re the dependent solve sycorrecting correcting corrections and corrections are considered to the correction of t	an appropriat actively in the zero dencies am zero des.	ZK te contract-te proceeding compo	a operating sperience of the sperience o
IE-UOS Irr tudents become advance ystems (file systems, production of the systems, production of the systems of	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windown cesses and threads, access rights, memory management, network interfaces). They gain dilters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Innear Algebra Theoretical foundation of algebra and mathematical principles of linear models of systems or methods for operating with polynomials and linear spaces. They are able to perform reprinciples to solving problems in 2D or 3D analytic geometry. They understand error-delathematical Logic The logic, the standard language and deductive system of mathematics and computer sciplerating Systems The lassical theory of operating systems (OS) in addition to the knowledge gained in the Blens. They understand the problems of race conditions and principles and algorithms for iniques of managing virtual memory, principles and architectures of disks and disk arrays.	ight. They are able. They are able to s around us, when natrix operations a tecting and error-opence. UOS module. The critical sections, ties, file systems and	e to design a participate re the dependent solve sycorrecting correcting corrections and corrections are considered to the correction of t	an appropriat actively in the description of the de	ZK te contract-te proceeding compo	a operating sperience of the sperience o
IIE-UOS Ir tudents become advance ystems (file systems, prochell, basic commands, and IIE-PAI tudents have knowledge rotection and do research trangible property. They have supply these mathematical IIE-MLO IN tudents understand the transport of the material IIE-MLO IN the material IIIE-MLO IN the material IIIE-MLO IN the material IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Interar Algebra Interest and interest and mathematical principles of linear models of systems are principles to solving problems in 2D or 3D analytic geometry. They understand error-defathematical Logic Interest and language and deductive system of mathematics and computer science logic, the standard language and deductive system of mathematics and computer science properating Systems Comparating Systems Comparating Systems Comparating Systems Comparating Systems (OS) in addition to the knowledge gained in the Blans. They understand the problems of race conditions and principles and algorithms for induces of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implement robability and Statistics Comparating Systems of probability thinking, ability of the synthesis both prior and posterior informations.	ight. They are able to the knowledge of the knowledge of the part	e to design a participate re the dependent of the depende	an appropriat actively in the zero dencies amongstems of line odes.	ZK te contract-te proceeding Z,ZK ong compoer equation Z,ZK of OS kerr ree allocatice gain basi	a operating sperience of to a sperience of the sper
Ite-UOS Irest to the total content of the total con	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Interar Algebra Interest and interest and mathematical principles of linear models of systems are principles to solving problems in 2D or 3D analytic geometry. They understand error-defathematical Logic Interest and language and deductive system of mathematics and computer science logic, the standard language and deductive system of mathematics and computer science process and systems (OS) in addition to the knowledge gained in the Blans. They understand the problems of race conditions and principles and algorithms for induse of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implement robability and Statistics elements of probability thinking, ability of the synthesis both prior and posterior informatione distribution of random variables and to solve applied probability problems in the area.	ight. They are able to they are able to they are able to s around us, when the triangle and error-or tence. UOS module. The critical sections, to s, file systems and to simple multithre tion and use to wo to of informatics and	e to design a participate re the deperence and solve sycorrecting correcting correcting correcting aded applicant with rand domputer	an appropriat actively in the zero dencies am zero des.	ZK te contract-te proceeding Z,ZK ong compoer equation Z,ZK of OS kerr ree allocatice gain basi	e operating sperience of the sperience o
IE-UOS Irr tudents become advance ystems (file systems, produced to breech) IE-PAI Ludents have knowledge rotection and do research tangible property. They have the said to breech the systems (IE-LIN Ludents understand the temply these mathematical IE-MLO Normal introduction to predicate the systems of th	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Intera Algebra Interest and interest and mathematical principles of linear models of systems are principles to solving problems in 2D or 3D analytic geometry. They understand error-defathematical Logic Interest and language and deductive system of mathematics and computer science logic, the standard language and deductive system of mathematics and computer science of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implement robability and Statistics elements of probability thinking, ability of the synthesis both prior and posterior information distribution of random variables and to solve applied probability problems in the area and so statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference in the parameters on the basis of statistical inference in the parameters of the parameters on the basis of statistical inference in the parameters of the parameters of	ight. They are able to they are able to they are able to s around us, when the triangle and error-or tence. UOS module. The critical sections, to s, file systems and to simple multithre tion and use to wo to of informatics and	e to design a participate re the deperence and solve sycorrecting correcting correcting correcting aded applicant with rand domputer	an appropriat actively in the zero dencies am zero des.	ZK te contract-te proceeding Z,ZK ong compoer equation Z,ZK of OS kerr ree allocatice gain basi	e operating sperience of to a plant of the sperience of t
ItE-UOS Ir tudents become advance ystems (file systems, proceedings and tudents have knowledge transpible property. They have the property of	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gaind filters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Intera Algebra Interestical foundation of algebra and mathematical principles of linear models of systems or methods for operating with polynomials and linear spaces. They are able to perform a principles to solving problems in 2D or 3D analytic geometry. They understand error-defathematical Logic as logic, the standard language and deductive system of mathematics and computer science of legic, the standard language and deductive system of mathematics and computer science of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implement robability and Statistics elements of probability thinking, ability of the synthesis both prior and posterior informatine distribution of random variables and to solve applied probability problems in the area ands of statistical inference to estimate unknown population parameters on the basis of andence of two or more random variables.	ight. They are able to they are able to they are able to s around us, when the triangle and error-or tence. UOS module. The critical sections, to s, file systems and to simple multithre tion and use to wo to of informatics and	e to design a participate re the deperence and solve sycorrecting correcting correcting correcting aded applicant with rand domputer	an appropriat actively in the zero dencies am zero des. Z d knowledge duling, resou devices. The zero om variables science. Us with basic me	ZK te contract-te proceeding Z,ZK ong compoer equation Z,ZK of OS kerr ree allocatice gain basi Z,ZK s. They will I ing statistice ethods of the	e operating sperience of to a plant of the sperience of t
ItE-UOS Irr tudents become advance ystems (file systems, proceeding to the property of the pro	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gain diliters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Intera Algebra Interest and interest and mathematical principles of linear models of systems are principles to solving problems in 2D or 3D analytic geometry. They understand error-defathematical Logic Interest and language and deductive system of mathematics and computer science logic, the standard language and deductive system of mathematics and computer science of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implement robability and Statistics elements of probability thinking, ability of the synthesis both prior and posterior information distribution of random variables and to solve applied probability problems in the area and so statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference to estimate unknown population parameters on the basis of statistical inference in the parameters on the basis of statistical inference in the parameters of the parameters on the basis of statistical inference in the parameters of the parameters of	ight. They are able to the saround us, when the tribute and the saround us, when the tribute and tribu	e to design a participate re the deperent solve sycorrecting correcting correcting correcting aded applicate with rand domputer acquainted versions.	an appropriat actively in the state of line odes. Z d knowledge duling, resou devices. The ations. Z om variables science. Us with basic me	ZK te contract-te proceeding component equation com	a operating sperience of the sperience o
BIE-UOS Irr Students become advance systems (file systems, proceed to the procession and do research students have knowledge or to the property. They have the property. They have the property of the property of the property. They have the property. They have the property. They have the property of the property. They have the property of the property. They have the property of the property. The property of the property	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gaind filters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyring and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Intera Algebra Interestical foundation of algebra and mathematical principles of linear models of systems or methods for operating with polynomials and linear spaces. They are able to perform a principles to solving problems in 2D or 3D analytic geometry. They understand error-definitely alternatical Logic Interestical Logic Interestical Systems It is larger than the standard language and deductive system of mathematics and computer science of the standard language and deductive system of mathematics and computer science in the standard language and deductive system of mathematics and computer science of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implementation of probability and Statistics Interestical inference to estimate unknown population parameters on the basis of syndence of two or more random variables. Interestical representation of algorithmics 1 Interestical algorithms for solving basic problems and write them in the C language. They understand sion. They learn the basics of algorithm complexity analysis. They know fundamental as	ight. They are able to they are able to they are able to they are able to the saround us, when the atrix operations a tecting and error-dence. UOS module. The critical sections, they file systems and they are to woo to finformatics and they get a they get a they are they get and data types (simulation).	e to design a participate re the dependent solve systemates and solve systemates and solve and scheel peripheral aded applicant with rand domputer acquainted to ple, structure	an appropriat actively in the active	ZK te contract-te proceeding Z,ZK ong componer equation Z,ZK of OS kerr ree allocative gain basive. Z,ZK s. They will be ing statistic ethods of the contraction of t	e operating sperience of the sperience o
BIE-UOS Ir students become advance systems (file systems, prochell, basic commands, and BIE-PAI It students have knowledge crotection and do research nangible property. They have supply these mathematical BIE-BIE-BIE-BIE-BIE-BIE-BIE-BIE-BIE-BIE-	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gaind filters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyres and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Inear Algebra Recordical foundation of algebra and mathematical principles of linear models of systems of methods for operating with polynomials and linear spaces. They are able to perform reprinciples to solving problems in 2D or 3D analytic geometry. They understand error-definathematical Logic algoic, the standard language and deductive system of mathematics and computer scillathematical Experimental Systems. They understand the problems of race conditions and principles and algorithms for diques of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implement probability and Statistics and to solve applied probability problems in the area and of statistical inference to estimate unknown population parameters on the basis of sudence of two or more random variables. Togramming and Algorithmics 1 algorithms for solving basic problems and write them in the C language. They understation. They learn the basics of algorithm complexity analysis. They know fundamental a rogramming and Algorithmics 2	ight. They are able to the saround us, when the saround us the saround use to wo the saround	e to design a participate re the dependent solve system a solin read scheel peripheral aded applicant with rand domputer acquainted vacquainted vacquainted scheel ple, structuriching, sorting	an appropriat actively in the active acti	ZK te contract-te proceeding Z,ZK te contract-te proceeding Z,ZK to ong compose ear equation Z,ZK to of OS kerr ree allocatice to gain basis Z,ZK to the term of t	e operating sperience of the sperience o
BIE-UOS Irr Students become advance systems (file systems, proceedable) SIE-PAI Intudents have knowledge or rotection and do research than the students understand the condition to predicate the students understand the condition to predicate the students understand the condition to predicate the students are introduced to correctly basic models of the students are introduced to correctly basic models of the students learn to construct unctions, concept of recursible-PA2 Postudents know the instruments and the students know the instruments and the students learn to construct unctions, concept of recursible-PA2 Students know the instruments and the students	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gaind filters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyris and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Inear Algebra Recordical foundation of algebra and mathematical principles of linear models of systems of methods for operating with polynomials and linear spaces. They are able to perform reprinciples to solving problems in 2D or 3D analytic geometry. They understand error-defathematical Logic The logic, the standard language and deductive system of mathematics and computer sciplerating Systems They understand the problems of race conditions and principles and algorithms for induces of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implement robability and Statistics Relements of probability thinking, ability of the synthesis both prior and posterior informationed distribution of random variables and to solve applied probability problems in the area and of statistical inference to estimate unknown population parameters on the basis of syndence of two or more random variables. Togramming and Algorithmics 1 algorithms for solving basic problems and write them in the C language. They understation. They learn the basics of algorithm complexity analysis. They know fundamental a rogramming and Algorithmics 2 ents of object-oriented programming and are able to use them for specifying and imple	ight. They are able to the saround us, when the saround us,	e to design a participate re the dependent solve systemates and solve systemates and solve and scheel peripheral aded applicant with rand domputer acquainted to ple, structurching, sortindata types (data types (an appropriat actively in the state of line odes. Z Z Z Z Z Z Z Z Z	ZK te contract-te proceeding Z,ZK ong componer equation Z,ZK of OS kerr ree allocative gain basive. Z,ZK s. They will be ing statistic ethods of the contract	a operating sperience of the sperience o
BIE-UOS Irstudents become advance systems (file systems, proceedings) and BIE-PAI Istudents have knowledge or or otection and do research nangible property. They have supply these mathematical BIE-DIA Introduction to predicate and threads implementation of the property of the property of the property. They have supply these mathematical BIE-DIA Introduction to predicate and threads implementation of the property of the propert	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gaind filters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyron and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Inear Algebra Ineoretical foundation of algebra and mathematical principles of linear models of systems of methods for operating with polynomials and linear spaces. They are able to perform a principles to solving problems in 2D or 3D analytic geometry. They understand error-defathematical Logic all logic, the standard language and deductive system of mathematics and computer soil perating Systems lassical theory of operating systems (OS) in addition to the knowledge gained in the Blacksical theory of operating systems (OS) in addition to the knowledge gained in the Blacksical theory of operating systems and architectures of disks and disk arrays system applications or for system administration. They are able to design and implementations of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implementations of probability thinking, ability of the synthesis both prior and posterior information distribution of random variables and to solve applied probability problems in the area and of statistical inference to estimate unknown population parameters on the basis of an adjorithm for solving basic problems and write them in the C language. They understation. They learn the basics of algorithm complexity analysis. They know fundamental a rogramming and Algorithmics 2 ents of object-oriented programming and are able to use them for specifying and implest inkned structures. They learn these skills using the programming language C++. Althoug	ight. They are able to the saround us, when the saround us,	e to design a participate re the dependent solve systemates and solve systemates and solve and scheel peripheral aded applicant with rand domputer acquainted to ple, structurching, sortindata types (data types (an appropriat actively in the state of line odes. Z Z Z Z Z Z Z Z Z	ZK te contract-te proceeding Z,ZK ong componer equation Z,ZK of OS kerr ree allocative gain basive. Z,ZK s. They will be ing statistic ethods of the contract	a operating sperience of the sperience o
Students become advance systems (file systems, productions) and the latest protection and do research than the students have knowledge or otection and do research than the latest protection and do research the latest protection and latest	and knowledgeable users of common operating systems: UNIX, Linux, or MS Window cesses and threads, access rights, memory management, network interfaces). They gai d filters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyr of and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Inear Algebra Recretical foundation of algebra and mathematical principles of linear models of system of methods for operating with polynomials and linear spaces. They are able to perform to principles to solving problems in 2D or 3D analytic geometry. They understand error-de- lathematical Logic legic, the standard language and deductive system of mathematics and computer sci- legic, the standard language and deductive system of mathematics and computer sci- legic, the standard language and deductive system of mathematics and computer sci- prerating Systems Rassical theory of operating systems (OS) in addition to the knowledge gained in the BI- right and Statistics elements of managing virtual memory, principles and architectures of disks and disk arrays respectively and Statistics elements of probability thinking, ability of the synthesis both prior and posterior information are distribution of random variables and to solve applied probability problems in the area ands of statistical inference to estimate unknown population parameters on the basis of sundence of two or more random variables. Togramming and Algorithmics 1 algorithms for solving basic problems and write them in the C language. They understan sion. They learn the basics of algorithm complexity analysis. They know fundamental a Togramming and Algorithmics 2 ents of object-oriented programming and are able to use them for specifying and imple tinked structures. They learn these skills using the programming language C++. Althoug to achieve the main objective (e.g., operator overloading, templ	ight. They are able to the saround us, when the saround us,	e to design a participate re the dependent solve systemates and solve systemates and solve and scheel peripheral aded applicant with rand domputer acquainted to ple, structurching, sortindata types (data types (an appropriat actively in the active	ZK te contract-te proceeding Z,ZK ong componer equation Z,ZK of OS kerr ree allocative gain basive. Z,ZK s. They will be ing statistic ethods of the contract	a operating sperience of the sperience o
BIE-UOS Irr Students become advance ystems (file systems, proc hell, basic commands, an BIE-PAI L Students have knowledge protection and do research ntangible property. They he BIE-LIN L Students understand the tr near. They know the basic pply these mathematical BIE-MLO M An introduction to predicat BIE-OSY C Students understand the c and threads implementation they understand the techn eccessary for developing s BIE-PST P Students are introduced to orrectly basic models of the methods, they master meth of possible statistical depe BIE-PA1 P Students learn to construct unctions, concept of recur BIE-PA2 Students know the instrum able). They can implement of all C++ features needed BIE-PPR	and knowledgeable users of common operating systems: UNIX, Linux, or MS Windowsesses and threads, access rights, memory management, network interfaces). They gaind filters. aw and Informatics of fundamental protection of intangible property, overview of contractual aspects of copyron and verification of the outputs concerning trademarks, patents, industrial design rights ave a good overview of the Czech Republic legislation as well as the EU legislation. Inear Algebra Ineoretical foundation of algebra and mathematical principles of linear models of systems of methods for operating with polynomials and linear spaces. They are able to perform a principles to solving problems in 2D or 3D analytic geometry. They understand error-defathematical Logic all logic, the standard language and deductive system of mathematics and computer soil perating Systems lassical theory of operating systems (OS) in addition to the knowledge gained in the Blacksical theory of operating systems (OS) in addition to the knowledge gained in the Blacksical theory of operating systems and architectures of disks and disk arrays system applications or for system administration. They are able to design and implementations of managing virtual memory, principles and architectures of disks and disk arrays system applications or for system administration. They are able to design and implementations of probability thinking, ability of the synthesis both prior and posterior information distribution of random variables and to solve applied probability problems in the area and of statistical inference to estimate unknown population parameters on the basis of an adjorithm for solving basic problems and write them in the C language. They understation. They learn the basics of algorithm complexity analysis. They know fundamental a rogramming and Algorithmics 2 ents of object-oriented programming and are able to use them for specifying and implest inkned structures. They learn these skills using the programming language C++. Althoug	ight. They are able to the saround us, when the saround error-cence. UOS module. The critical sections, the systems and it simple multithre ion and use to wo a of informatics and sample. They get a saround data types (simple gorithms for sear menting abstract of the saround and the saround a	e to design a participate re the dependent solve systemate solve and solve systemate acquainted with rand domputer acquainted with randing, sorting that a types (alle of programments).	an appropriat actively in the active acti	ZK te contract-te proceeding Z,ZK te contract-te proceeding Z,ZK to ong compose ear equation Z,ZK to of OS kerr rece allocation (a) gain basis Z,ZK to the the term of the ter	e operating sperience of the sperience o

BIE-BEZ

Students understand the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric and asymmetric cryptosystems, and hash functions. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptosystems for computer systems. They are able to properly and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal aspects of information security, security standards, social engineering, and basic principles of security management.

BIE-SI1.2 Software Engineering I Z,ZK

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 parallel (only summer semester), the students can work on a single more complex project and they are classified to both courses for a single project. This course does not teach the students programming, nor any particular technology, framework or programming language. The students are required to have some knowledge of these to apply them on their team project.

Code of the group: BIE-EPDSK

Name of the group: Business Economics

Requirement credits in the group: In this group you have to gain at least 4 credits (at most 5)

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-EPD	Business Economics	KZ	4	2+2	L	PP
BIE-EPD.2	Business Economics	KZ	5	2+2	L	PP
BIE-EKP	Enterprise Economics	Z,ZK	5	2+2	Z	PP

Characteristics of the courses of this group of Study Plan: Code=BIE-EPDSK Name=Business Economics

BIE-EPD	Business Economics	KZ	4
Students get common ki	nowledge of business economics. They understand the goals and functions of a business, the business environment, and the bi	usiness lifecycle. ²	They understand
the relationships among	profit, production volume, price and costs. They have an overview of applicable taxes. They know the fundamentals of finar	cial mathematics	and investment
decision making. They	can draft a business plan. They understand management functions, corporate processes and corporate governance.		

Business Economics

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.

BIE-EKP Enterprise Economics Z,ZK

Students get common knowledge of business economics. They understand the goals and functions of a business, the business environment, and the business lifecycle. They understand the relationships among profit, production volume, price and costs. They have an overview of applicable taxes. They know the fundamentals of financial mathematics and investment decision making. They can draft and interpret a business plan. They understand management functions, corporate processes and corporate governance.

Name of the block: Compulsory courses of the specialization

Minimal number of credits of the block: 50

The role of the block: PO

Code of the group: BIE-PO-TI.2

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

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete at least 6 courses

Credits in the group: 30 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-APS	Architectures of Computer Systems Róbert Lórencz, Tomáš Zahradnický, Jiří Buček Tomáš Zahradnický Róbert Lórencz (Gar.)	Z,ZK	6	2+2	Z	РО
BIE-VZD	Data Mining Marcel Jiřina Pavel Kordík Pavel Kordík (Gar.)	Z,ZK	4	2+2	Z,L	РО
BIE-EFA	Efficient Algorithms Jiřina Scholtzová Jiřina Scholtzová Pavel Tvrdík (Gar.)	Z,ZK	5	2+2	Z	РО
BIE-EIA	Efficient Implementation of Algorithms Ivan Šimeček Ivan Šimeček (Gar.)	Z,ZK	5	2+1	Z	РО
BIE-GRA	Graph Algorithms and Complexity Theory Miroslav Balík	Z,ZK	5	2+2	L	РО

BIE-PJP Programming Languages and Jan Trávníček, Radomír Polách, Jan Ja Janoušek (Gar.)	Polách Jan Z,ZK	5	2+1	L	РО
--	-----------------	---	-----	---	----

Characteristics of the courses of this group of Study Plan: Code=BIE-PO-TI.2 Name=Compulsory Courses of Bachelor Branch Computer Science, Presented in English

BIE-APS Architectures of Computer Systems

Z,ZK

6

Students understand computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining and memory hierarchy. They know the main concepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the techniques that today's processors use to increase program execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles of modern trends in computer architectures and how will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They understand the principles and architectures of shared-memory multiprocessor systems and the issues of memory consistency.

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 will 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-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-EIA Efficient Implementation of Algorithms

7 7K

5

Students learn to combine their programming skills (ability to design efficient algorithms) and HW knowledge (utilization of all available features of a particular processor and memory architecture). Students learn the basics of code tuning and optimization.

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.

BIE-PJP Programming Languages and Compilers

Z,ZK

5

Students master basic methods of implementation of common high-level programming languages. They get experience with the design and implementation of individual compiler parts for a simple programming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has a certain syntax into a target form and write a compiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, but extends to all other programs for parsing and processing text in a language defined by a LL(1) grammar.

Code of the group: BIE-OST

Name of the group: Miscellaneous Compulsory Courses of Bachelor Branches, Presented in English Requirement credits in the group: In this group you have to gain 20 credits

Requirement courses in the group: In this group you have to complete at least 5 courses

Credits in the group: 20

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-TED	Electronic Documentation Design Ondřej Guth	KZ	5	2+2	L	РО
BIE-EC	English External Certificate Miroslav Balík	Z	2	0+0	L	РО
BIE-UOS	Introduction to Operating System UNIX Jan Žďárek	KZ	5	2+2	Z	РО
BIE-PAI	Law and Informatics Zdeněk Kučera Miroslav Balík Zdeněk Kučera (Gar.)	ZK	3	2+0	Z	РО
BIE-PPR	Project, Presentation and Rhetorics (BIE-PPR) Dana Vynikarová Dana Vynikarová (Gar.)	KZ	5	2+1	Z	РО

Characteristics of the courses of this group of Study Plan: Code=BIE-OST Name=Miscellaneous Compulsory Courses of Bachelor Branches, Presented in English

BIE-TED	Electronic Documentation Design	KZ	5
Students are able to cre	eate electronic documentation, namely technical reports. They learn alternatives of WYSIWYG editors and are able to produc	ce well-formed ted	hnical reports
using configurable tools	s appropriate for ICT professionals. They learn the documentation of software projects, including basics of UML and docume	ntation of source	code.

BIE-UOS Introduction to Operating System UNIX

ΚZ

Students become advanced and knowledgeable users of common operating systems: UNIX, Linux, or MS Windows. They understand the fundamental principles of the operating systems (file systems, processes and threads, access rights, memory management, network interfaces). They gain the knowledge of advanced users, with hands-on experience 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 an appropriate contract-based 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 intangible property. They have a good overview of the Czech Republic legislation as well as the EU legislation.

BIE-PPR	Project, Presentation and Rhetorics (BIE-PPR)	KZ	5						
This subject is aimed to	This subject is aimed to the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create and prepare interactive presentations								
and presenting before	and presenting before an audience. Students will also learn to write technical reports and scientific texts.								
BIE-EC	English External Certificate	Z	2						

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

Name of the group: Compulsory Elective Economics, and Management Courses, Presented in English

Requirement credits in the group: In this group you have to gain at least 4 credits (at most 12)

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

Credits in the group: 4

Note on the group:

BIE-FIP

in courts.

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-FIP	Accounting and Corporate Finance Miroslav Balík	Z,ZK	5	2+2	Z	VE
BIE-FTR	Financial Markets Pavla Vozárová Pavla Vozárová Pavla Vozárová (Gar.)	Z,ZK	4	2+2	Z	VE
BIE-MIK	Fundamentals of Microeconomics Pavla Vozárová	Z,ZK	4	2+2	L	VE
BIE-TIS	Information Systems Design Miroslav Balík	Z,ZK	5	2+1	Z	VE
BIE-PRP	Law and Business Miroslav Balík	Z,ZK	4	2+1	L	VE

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

Z.ZK

5

Students understand th	e principles and have practical skills in corporate finance. They have a grasp of accounting principles and understand the co	ncepts of assets a	ind liabilities,			
costs, revenues and pro	ofit. They know the structure of financial statements and know how to analyze them. They are able to evaluate investments an	d understand the	effect of inflation			
and taxes on investmen	nt decisions.					
BIE-FTR	Financial Markets	Z,ZK	4			
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 cred	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 er	globes both a description of financial markets and related economic theories, and an overview of mathematical and statistical	al tools used in this	s field.			
BIE-MIK	Fundamentals of Microeconomics	Z,ZK	4			
This a introductory coul	se of microeconomics designed for students without previous economic background. It describes different market regimes a	nd ways how firm	can react to			
consumer demand, cor	npetitor strategies, government intervention, uncertainty and information asymmetry. All concepts are illustrated on real life e	xamples.				
BIE-TIS	Information Systems Design	Z,ZK	5			
Students will learn vario	ous ways and methods of design and implementation of information systems. They will gain overview in different kinds of ISs	, appropriate tech	nologies, and			
practical areas of their	deployment. Students will also be able to consider customers' requirements on the IS and choose proper technologies for the	eir implementation				
BIE-PRP	Law and Business	Z,ZK	4			
Students understand the basic issues when engaging in business activities in the CR and in the EU. Students learn to establish companies, gain necessary business permits, conclude						
commercial or civil conf	tracts. Students also get acquainted with the principles of antitrust regulation and learn to resolve disputes in the area of busi	ness, labour, or ci	vil relationships			

Name of the block: Compulsory elective humanities courses

Accounting and Corporate Finance

Minimal number of credits of the block: 2

The role of the block: VH

Code of the group: BIE-PV-HU

Name of the group: Compulsory Elective Bachelor Social Courses, Presented in English Requirement credits in the group: In this group you have to gain at least 2 credits (at most 6)

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

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
BI-HMI	History of Mathematics and Informatics	Z,ZK	3	2+1	L	VH
FIE-HTE	History of Technology and Economics	ZK	2	2+0	Z,L	VH
AE0B16FI1	Philosophy I	KZ	4	2+2s	Z,L	VH

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

BI-HMI	History of Mathematics and Informatics	Z,ZK	3		
FIE-HTE	History of Technology and Economics	ZK	2		
The course introduces the scientific disciplines of history and technology, economic and social history of the Czech lands and Czechoslovakia in comparison with the development of					
the European region 19	to 21 century.				
AE0B16FI1	Philosophy I	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 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

Name of the group: Elective Courses of Bachelor Study Program Informatics, Presented in English

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group:

Besides the Modules listed here as Elective, You can enroll in any Module that offers the Program

BIE for Your Study Form, which you have nt enrolled in as a Compulsory or Compulsory Optional

 $\qquad \qquad \mathsf{Module}.$

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-FIP	Accounting and Corporate Finance Miroslav Balík	Z,ZK	5	2+2	Z	V
BIE-APS	Architectures of Computer Systems Róbert Lórencz, Tomáš Zahradnický, Jiří Buček Tomáš Zahradnický Róbert Lórencz (Gar.)	Z,ZK	6	2+2	Z	٧
BIE-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4	2+2	L	V
BIE-AAG	Automata and Grammars Jan Trávníček, Jan Holub, Jan Janoušek Radomír Polách Jan Holub (Gar.)	Z,ZK	6	2+2	Z	V
BIE-BAP	Bachelor Theses Miroslav Balík Miroslav Balík (Gar.)	Z	14	0+0	L,Z	V
BIE-ZRS	Basics of Systems Control Kateřina Hyniová	Z,ZK	4	2+2	L	V
BIE-PGR	Computer Graphics Miroslav Balík	Z,ZK	6	2+2	Z	V
BIE-PSI	Computer Networks	Z,ZK	5	2+2	L	V
BIE-SAP	Computer Structures and Architectures	Z,ZK	6	2+3	L	V
BIE-JPO	Computer Units Jiří Douša Miroslav Balík Alois Pluháček (Gar.)	Z,ZK	5	2+2	Z	V
BIE-VZD	Data Mining Marcel Jiřina Pavel Kordík Pavel Kordík (Gar.)	Z,ZK	4	2+2	Z,L	V
BIE-DBS	Database Systems Michal Valenta, Josef Pavlíček Miroslav Balík Michal Valenta (Gar.)	Z,ZK	6	2+3	Z,L	V
BIE-CAO	Digital and Analog Circuits Kateřina Hyniová Miroslav Balík Kateřina Hyniová (Gar.)	Z,ZK	5	2+2	Z	V
BIE-EFA	Efficient Algorithms Jiřina Scholtzová Jiřina Scholtzová Pavel Tvrdík (Gar.)	Z,ZK	5	2+2	Z	V
BIE-EIA	Efficient Implementation of Algorithms Ivan Šimeček Ivan Šimeček Ivan Šimeček (Gar.)	Z,ZK	5	2+1	Z	V
BIE-TED	Electronic Documentation Design Ondřej Guth	KZ	5	2+2	L	V
BIE-ZMA	Elements of Calculus Antonella Marchesiello Tomáš Kalvoda Tomáš Kalvoda (Gar.)	Z,ZK	6	3+2	Z	V

BIE-ZDM	Elements of Discrete Mathematics Josef Kolář Miroslav Balík Josef Kolář (Gar.)	Z,ZK	5	2+2	Z	V
BIE-VES	Embedded Systems Miroslav Skrbek Miroslav Balík Miroslav Skrbek (Gar.)	Z,ZK	5	2+2	L	V
BIE-EC	English External Certificate Miroslav Balik	Z	2	0+0	L	V
BIE-GRA	Graph Algorithms and Complexity Theory Miroslav Balik	Z,ZK	5	2+2	L	V
BIE-TIS	Information Systems Design Miroslav Balík	Z,ZK	5	2+1	Z	V
BIE-IMA	Introduction to Mathematics Martin Malachov Karel Klouda Karel Klouda (Gar.)	Z	4	0+3	Z	V
BIE-UOS	Introduction to Operating System UNIX Jan Žďárek	KZ	5	2+2	Z	V
BIE-ZSI	Introduction to Software Engineering	Z,ZK	5	2+1	Z	V
BIE-ZWU	Introduction to Web and User Interfaces	Z,ZK	4	2+2	L	V
BIE-PRP	Law and Business Miroslav Balik	Z,ZK	4	2+1	L	V
BIE-PAI	Law and Informatics Zdeněk Kučera Miroslav Balík Zdeněk Kučera (Gar.)	ZK	3	2+0	Z	V
BIE-LIN	Linear Algebra	Z,ZK	7	4+2	L	V
BIE-MLO	Mathematical Logic Kateřina Trlifajová Kateřina Trlifajová (Gar.)	Z,ZK	5	2+1	Z	V
BIE-MGA	Multimedia and Graphics Applications Miroslav Balík	Z,ZK	5	2+2	Z	V
BIE-ADS	Network Administration Viktor Černý, Jiří Smítka Viktor Černý Jiří Smítka (Gar.)	Z,ZK	5	2+2	Z	V
BIE-OMO	Object Modelling Martin Podloucky, Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	2+2	Z	V
BI-OOP	Object-Oriented Programming Robert Pergl	Z,ZK	4	2+2	Z	V
BIE-OSY	Operating Systems	Z,ZK	5	2+1	L	V
BIE-PNO	Practical Digital Design Martin Novotný Miroslav Balík Martin Novotný (Gar.)	KZ	5	2+2	Z	V
BIE-PST	Probability and Statistics Petr Novák Rudolf Bohumil Blažek (Gar.)	Z,ZK	5	2+2	Z	V
BIE-PHP.1	Programing in PHP Tomáš Kadlec Tomáš Kadlec (Gar.)	KZ	4	0+3	Z	V
BIE-PA1	Programming and Algorithmics 1 Jan Trávníček, Miroslav Balik, Ladislav Vagner, Josef Vogel, Ondřej Guth Jan Trávníček Ladislav Vagner (Gar.)	Z,ZK	6	2+2+2	Z	V
BIE-PA2	Programming and Algorithmics 2 Jan Trávníček	Z,ZK	7	2+2	L	V
BIE-PJV	Programming in Java Jiří Daněček Miroslav Balík Jiří Daněček (Gar.)	Z,ZK	4	2+2	Z	V
BIE-PS2	Programming in shell 2 Jan Žďárek Jan Žďárek (Gar.)	Z,ZK	4	2+2	L	V
BIE-PJP	Programming Languages and Compilers Jan Trávníček, Radomír Polách, Jan Janoušek Radomír Polách Jan Janoušek (Gar.)	Z,ZK	5	2+1	L	V
BIE-PPR	Project, Presentation and Rhetorics (BIE-PPR) Dana Vynikarová Dana Vynikarová (Gar.)	KZ	5	2+1	Z	٧
BIE-SRC	Real-time Systems Miroslav Balík	KZ	4	2+2	L	V
BIE-SKJ	Scripting Languages	Z,ZK	4	2+1	L	V
BIE-VWM	Searching Web and Multimedia Databases Miroslav Balík	Z,ZK	5	2+1	L	V
BIE-BEZ	Security	Z,ZK	6	2+2	L	V
BIE-SI2	Software Engineering 2 Miroslav Balik	Z,ZK	5	2+0	Z	V
BIE-SP1	Team Software Project 1 Zdeněk Rybola	KZ	4	0+2	Z	V
BIE-SP2	Team Software Project 2 Zdeněk Rybola, Stanislav Kuzněcov Stanislav Kuzněcov Zdeněk Rybola (Gar.)	KZ	6	0+0	Z	V
BI-TS1	Theoretical Seminar I Ondřej Suchý, Tomáš Valla Jan Janoušek	Z	4	0+2	Z	V
BI-TS2	Theoretical Seminar II Tomáš Valla	Z	4	0+2	L	V
BI-TS3	Theoretical Seminar III Ondřej Suchý, Tomáš Valla Jan Janoušek Ondřej Suchý (Gar.)	Z	4	0+2	Z	V
BI-TS4	Theoretical Seminar IV Jan Janoušek	Z	4	0+2	L	V

BIE-ADU.1	Unix Administration Jan Žďárek Jan Žďárek Jan Žďárek (Gar.)	Z,ZK	5	2+2	L	V
BIE-ADU	Unix Internals and Administration Jan Žďárek	Z,ZK	6	2+2	L	V
BIE-TUR	User Interface Design Tomáš Zahradnický	Z,ZK	4	2+2	L	V
BIE-AWD	Web and Database Server Administration	Z,ZK	4	2+2	L	V
BIE-WMM	Web and Multimedia Tomáš Kadlec	Z,ZK	5	2+1	Z	V
BIE-TWA	Web Application Design	Z,ZK	5	2+2	L	V
BIE-ADW	Windows Administration Jiří Kašpar, Miroslav Prágl Miroslav Prágl (Gar.)	Z,ZK	5	2+1	Z	V
BIE-3DT.1	3D Printing	KZ	4	0+3	L	V

DIE-ADW	Jiří Kašpar, Miroslav Prágl Miroslav Prágl (Gar.)	∠,∠r∖		2 7 1	_	V
BIE-3DT.1	3D Printing	KZ	4	0+3	L	V
Characteristics (Presented in En	of the courses of this group of Study Plan: Code=BIE-V Name=Elective	e Courses of	Bachelo	r Study P	rogram lı	nformatic
BIE-AAG	Automata and Grammars			Z	Z,ZK	6
Students are introduc	ced to basic theoretical and implementation principles of the following topics: construction, use	and mutual trans	sformations			ar expression
and regular grammar	rs, translation finite automata, construction and use of pushdown automata, hierarchy of formal	languages, relat	ionships bet	ween forma	l languages a	and automata
Knowledge acquired	through the module is applicable in designs of algorithms for searching in text, data compress	ion, simple parsi	ng and trans	slation, and	design of dig	ital circuits.
BIE-BAP	Bachelor Theses				Z	14
BIE-PSI	Computer Networks			Z	Z,ZK	5
Students understand	the basic common techniques, protocols, technologies, and algorithms necessary to commun	icate in compute	r networks f	1		d to 4th layer
of the ISO OSI mode	I. They also get a basic understanding of communication media, security, and network adminis	stration. Students	s will be able	e to write a s	imple netwo	rk applicatior
and configure a simp	ele network.					
BIE-SAP	Computer Structures and Architectures			\overline{z}	Z,ZK	6
Students understand	basic digital computer units and their structures, functions, and hardware implementation: ALI	U, control unit, m	emory syste	1		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 to	ols.	
BIE-DBS	Database Systems			\overline{z}	Z,ZK	6
	ced to the database engine architecture and typical user roles. They are briefly introduced to v	arious database	models. The		· 1	databases
(including integrity co	onstraints) using a conceptual model and implement them in a relational database engine. They	y get a hands-on	experience	with the SQI	_ ∟ language, a	as well as wif
its theoretical foundat	tion the relational database model. They learn the principles of normalizing a relational database	schema. They u	inderstand th	ne fundamer	ntal concepts	of transactio
processing, controlling	ng parallel user access to a single data source, as well as recovering a database engine from a	a failure. They ar	e briefly intro	oduced to sp	oecial ways c	of storing dat
in relational database	es with respect to speed of access to large quantities of data. This introductory-level module do	oes not cover: A	dministration	of database	e systems, d	ebugging an
optimizing database	applications, distributed database systems, data stores.					
BIE-CAO	Digital and Analog Circuits			Z	Z,ZK	5
Students get the fund	damental understanding of technologies underlying electronic digital systems. They understand	d the basic theor	etical model	s and princip	ples of functi	onality of
transistors, gates, circ	cuits, and conductors. They are able to design simple circuits and evaluate circuit parameters.	They understand	I the differen	ces betweer	n analog and	digital mode
of electronic devices.						
BIE-TED	Electronic Documentation Design				KZ	5
Students are able to	create electronic documentation, namely technical reports. They learn alternatives of WYSIW	YG editors and a	re able to pr	oduce well-f	ormed techn	ical reports
using configurable to	ols appropriate for ICT professionals. They learn the documentation of software projects, inclu	iding basics of U	ML and doc	umentation of	of source coo	.et
BIE-ZMA	Elements of Calculus			Z	Z,ZK	6
Students acquire kno	owledge and understanding of the fundamentals of classical calculus so that they are able to a	pply mathematic	al way of thi	nking and re	asoning and	are able to
use basic proof techr	niques. They get skills to practically handle functions of one variable in solving the problems in	informatics. The	y understan	d the links b	etween the i	ntegrals and
sums of sequences.	They are able to estimate lower or upper bounds of values of real functions and to handle sim	ple asymptotic ex	xpressions.			
BIE-ZDM	Elements of Discrete Mathematics			Z	Z,ZK	5
Students get both a n	nathematical sound background, but also practical calculation skills in the area of combinatoric	s, value estimation	on and formu	ıla approxim	ation, and to	ols for solvin
recurrent equations.						
BIE-UOS	Introduction to Operating System UNIX				KZ	5
Students become ad	vanced and knowledgeable users of common operating systems: UNIX, Linux, or MS Window	s. They understa	and the funda	amental prin	ciples of the	operating
systems (file systems	s, processes and threads, access rights, memory management, network interfaces). They gain	the knowledge o	f advanced	users, with h	ands-on exp	erience of th
shell, basic command	ds, and filters.					
BIE-PAI	Law and Informatics				ZK	3
Students have knowle	edge of fundamental protection of intangible property, overview of contractual aspects of copyrig	ght. They are able	e to design a	n appropriat	e contract-ba	ased copyrigi
protection and do res	search and verification of the outputs concerning trademarks, patents, industrial design rights.	They are able to	participate a	actively in th	e proceeding	gs to register
intangible property. T	hey have a good overview of the Czech Republic legislation as well as the EU legislation.					
BIE-LIN	Linear Algebra			Z	Z,ZK	7
Students understand	the theoretical foundation of algebra and mathematical principles of linear models of systems	around us, wher	e the depen	idencies am	ong compon	ents are only
linear. They know the	e basic methods for operating with polynomials and linear spaces. They are able to perform ma	atrix operations a	and solve sy	stems of line	ar equations	3. They can
apply these mathema	atical principles to solving problems in 2D or 3D analytic geometry. They understand error-dete	ecting and error-o	correcting co	odes.		
BIE-MLO	Mathematical Logic			Z	Z,ZK	5
An introduction to pre	edicate logic, the standard language and deductive system of mathematics and computer scien	nce.		'		
BIE-OSY	Operating Systems			7	Z,ZK	5
	the classical theory of operating systems (OS) in addition to the knowledge gained in the BI-L	JOS module. The	ey get a solid			_
	entations. They understand the problems of race conditions and principles and algorithms for c		, ,	•		
· · · · · · · · · · · · · · · · · · ·	techniques of managing virtual memory, principles and architectures of disks and disk arrays,			-		
· · · · ·	ning system applications or for system administration. They are able to design and implement	=				0 -

necessary for developing system applications or for system administration. They are able to design and implement simple multithreaded applications.

BIE-PST	Probability and Statistics	Z,ZK	5
Students are introduced	to elements of probability thinking, ability of the synthesis both prior and posterior information and use to work with random vi	1	be able to apply
correctly basic models	of the distribution of random variables and to solve applied probability problems in the area of informatics and computer scier	nce. Using statistic	cal inference
methods, they master n	nethods of statistical inference to estimate unknown population parameters on the basis of sample. They get acquainted with b	asic methods of th	ne determination
of possible statistical de	ependence 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 ' 1	
	cursion. They learn the basics of algorithm complexity analysis. They know fundamental algorithms for searching, sorting, ar		
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	·
	nent linked structures. They learn these skills using the programming language C++. Although this is not a module of programmi		- 1
	ded to achieve the main objective (e.g., operator overloading, templates).	ng m o · · , otadoni	lo di o inti oddoca
BIE-PPR		KZ	5
	Project, Presentation and Rhetorics (BIE-PPR)		- 1
-	the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create an	a prepare interacti	ve presentations
	an audience. Students will also learn to write technical reports and scientific texts.		
BIE-BEZ	Security	Z,ZK	6
	e mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmet	=	
	ey also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryp	-	
	ly and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to lega	al aspects of inform	nation security,
security standards, soc	ial engineering, and basic principles of security management.		
BIE-APS	Architectures of Computer Systems	Z,ZK	6
Students understand co	mputer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipel	ining and memory	hierarchy. They
know the main concepts	of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the	techniques that too	day's processors
use to increase program	n execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the princip	les of modern tren	nds in computer
architectures and how	will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. T	hey understand th	e principles and
	memory multiprocessor systems and the issues of memory consistency.	•	
BIE-VZD	Data Mining	Z,ZK	4
	ן טממ אוווווון I to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, m	1 1	
	data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships		
·			
	mentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply be	asic data mining to	DOIS to COMMON
	, regression, clustering).		_
BIE-EFA	Efficient Algorithms	Z,ZK	5
-	ew of efficient algorithms and data structures for solving classical algorithmic problems, such as searching and sorting, on dyl		-
	sign and implement such algorithms, to use methods for analysing their computational and memory complexity. They unders	_	-
O(n.log n) time complex	city, special sorting algorithms with linear complexity, algorithms for associative and address searching. They are able to use the	e efficient dynamic	data structures,
such as hash tables, se	earch trees, balanced search trees, heaps, B-trees, and others. They are able to work with recursive algorithms and dynamic	programming.	
BIE-EIA	Efficient Implementation of Algorithms	Z,ZK	5
Students learn to comb	ine their programming skills (ability to design efficient algorithms) and HW knowledge (utilization of all available features of a	particular process	sor and memory
architecture). Students	learn the basics of code tuning and optimization.		·
BIE-GRA	Graph Algorithms and Complexity Theory	Z,ZK	5
-	w of typical usages of graph models in computing. They learn algorithmic methods of solving graph problems. They understand	1 1	-
-	y (flows in networks, heuristic search, approximation of complex problems). Students get basic competence in computer scie	-	
	and issues of NP-completeness and NP-hardness.	ince background.	liley dilderstand
		7.71/	-
BIE-PJP	Programming Languages and Compilers	Z,ZK	. 5
	methods of implementation of common high-level programming languages. They get experience with the design and impleme		
	ng language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that	•	<u> </u>
<u>-</u>	er based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages,	, but extends to all	other programs
	ing text in a language defined by a LL(1) grammar.		
BIE-EC	English External Certificate	Z	2
BIE-FIP	Accounting and Corporate Finance	Z,ZK	5
	e principles and have practical skills in corporate finance. They have a grasp of accounting principles and understand the co	1	and liabilities,
	offit. They know the structure of financial statements and know how to analyze them. They are able to evaluate investments an	-	
and taxes on investmer	·		
BIE-TIS	Information Systems Design	Z,ZK	5
_	pus ways and methods of design and implementation of information systems. They will gain overview in different kinds of ISs	1 1	
	deployment. Students will also be able to consider customers' requirements on the IS and choose proper technologies for the		-
•			
BIE-PRP	Law and Business	Z,ZK	4
	e basic issues when engaging in business activities in the CR and in the EU. Students learn to establish companies, gain nece		
	tracts. Students also get acquainted with the principles of antitrust regulation and learn to resolve disputes in the area of busi	ness, labour, or ci	vil relationships
in courts.			
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 class	ssical tasks from th	ne areas of state
space search, multi-age	ent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algori	thms and the neur	ral networks, will
be presented as well.			
BIE-ZRS	Basics of Systems Control	Z,ZK	4
_	of System Control is designed for anyone interested in applied computer science in bachelor studies. A brief introduction to	1 ' 1	
-	by our graduates in the industrial practice. Students will gain knowledge in this rapidly evolving field of great future. We will for		
	and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems. We will		
	near dynamic systems analysis and design verification, simple PID feedback, PSD and fuzzy controllers. This is a survey cou		
= -	escription of the system model, the basic linear dynamic systems analysis and design verification and simple PID feedback, PS		
-	escription of the system model, the basic linear dynamic systems analysis and design verification and simple PiD feedback, Po- eand actuators in control loops, issues of stability in control systems, single and continuous adjustment of the controller paral	=	
_	on of continuous and digital controllers and PLC control. The themes of lectures are accompanied by a number of useful examples of the controllers and PLC control.		
implementations.	on containable and digital controllers and rive control. The trieffies of fectures are accompanied by a number of useful example.	npice and practice	ai iridustriai
ппристистианопъ.			

BIE-PGR	Computer Graphics	Z,ZK	6
•	gram a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add to		
•	surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in		
	ietric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid f PU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surfa		-
BIE-JPO	Computer Units	Z,ZK	5
	nal structure and organization of computer or processor components and their interfacing with the environment. They unders	, , , , , , , , , , , , , , , , , , ,	-
	nal memories (addressable, LIFO, FIFO and CAM). They know the organization of an arithmetic unit. They learn the design r	•	
controllers, as well as b	asic principles of communication with peripheral devices and buses. They understand the architecture of a bus system.		
BIE-VES	Embedded Systems	Z,ZK	5
•	embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and embedded systems and develop software for them.	edded processors	, their integrated
	ramming methods, and applications. They get practical skills with development kits and tools.		_
BIE-IMA	Introduction to Mathematics	Z	4
examples.	ttend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are	e able to apply th	nem in particular
BIE-ZSI	Introduction to Software Engineering	Z,ZK	5
	stand formalized descriptions of analytic and design models in UML. To a limited extent, they take part in creating such mode		
	Students should be able to discuss the models with other members of a software development team. This experience and skills		-
in such teams as memb	·		
BIE-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
The course focuses on	correct web design. It addresses technical aspects as well as correct user interface design.	, ,	
BIE-MGA	Multimedia and Graphics Applications	Z,ZK	5
	experience with applications for raster and vector 2D/3D graphics and DTP. They learn basic methods of creating and editing		
	damentals of computer graphics. During the semester, students work on various parts of a complex project involving 2D/3D of	·	
BIE-ADS	Network Administration	Z,ZK	5
•	skills needed to administrate computer networks and to ensure their security. They understand and are able to practically use		
	irchitecture of computer networks, routing protocols and backbone routing mechanisms, directory and naming services and a secure client connections and secure data transfer, flow control mechanisms, and service availability monitoring.	ddressing, admin	istration of
BIE-OMO		Z,ZK	5
	Object Modelling master conceptual modelling of business structures, they will learn fundamentals of OntoUML notation and methodology. Str		-
	radigm, i.e. terms object, method, message, class, class instance, composition, inheritance, collections. Students will learn to		
•	entation model and they will learn fundamentals of pure object-oriented implementation in Smalltalk and pure object database		•
rules and queries upon	the object database.		
BI-OOP	Object-Oriented Programming	Z,ZK	4
Students will learn the p	ure object-oriented paradigm, being a tool for effective implementation of quality, evolvable business software systems. They	will understand fu	ndamentals and
	ply it for solving typical implementation tasks. Students will learn syntax and programming fundamentals of a pure OO open-	source technology	y Pharo. Various
	ning languages utilising the OO concepts will be introduced in the subject, as well.	1/7	
BIE-PNO	Practical Digital Design	KZ	5 (UDL language
•	w of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand t hnologies FPGA and ASIC.	he basics of the v	/nbl language,
BIE-PHP.1	Programing in PHP	KZ	4
	is an introduction to PHP - language and technology. Students will learn also best practices and will use tool that eases deve		
	nts of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for		
of study.			
BIE-PJV	Programming in Java	Z,ZK	4
The course Programmir	ng in Java will introduce students to the object oriented programming in Java programming language. Beside of basics of Java	language the fun	damental library
· · · · · · · · · · · · · · · · · · ·	There are especially file, net, data structures, database and concurrent library.		
BIE-PS2	Programming in shell 2	Z,ZK	4
	overview of scripting languages, introduction into syntax, semantics, programming style, pros and cons. In addition, they gain a		
•	rticular scripting languages and will get practical experience with shell script programming. Note to Erasmus students: Prior know rerequisite. Namely basic Bourne shell usage, as well as orientation in user filesystem tools (cp, ln, mkdir, rm) and some ex		
•	ough it is possible to attend the classes without this knowledge, it may be difficult to follow the lectures and to complete all re-	-	
without them.			
BIE-SRC	Real-time Systems	KZ	4
Students obtain the bas	ic knowledge in the Real-Time (RT) theory and in the design methods for RT systems including the dependability issues. The	reticla knowledge	es from lectures
	erified on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems, there	efore the first use	d design kits are
the same as in BI-VES			
BIE-SKJ	Scripting Languages	Z,ZK	4
	overview of scripting languages, introduction into syntax, semantics, programming style, pros and cons. In addition, they gain		
•	ar scripting languages and will get practical experience with shell script programming. Note to Erasmus students: Prior knowl rerequisite. Namely basic Bourne shell usage, as well as orientation in user filesystem tools (cp, ln, mkdir, rm) and some ex		
•	ough it is possible to attend the classes without this knowledge, it may be difficult to follow the lectures and to complete all re-	-	
without them.		, .	
BIE-VWM	Searching Web and Multimedia Databases	Z,ZK	5
Students gain basic kno	wledge concerning retrieval techniques on the web, where the web environment is viewed as a large distributed and heteroge		ory. In particular,
	tand the techniques for retrieving text and hypertext documents (the web pages). Moreover, they will be aware of similarity re	trieval methods for	ocused on
	ia databases (unstructured data collections, respectively).		
BIE-SI2	Software Engineering 2	Z,ZK	5
	rk methodically with respect to software development methodic, especially Unified Process methodic and Unified Modeling Lang		
	al roles in a typical software team, as well as get a practical experience with them in the concurrent BIE-SP2 module. Studer easuring software quality. This knowledge will get extended with a practical experience thanks to the concurrently running BIE	_	i iuca about
contrare teeting and me	accounts of the control of the contr	or z module.	

BIE-SP1	Team Software Project 1	KZ	4
In 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 s	seminars/tutorials	in this course.
This course is to be enre	olled in parallel with BIE-SI1.2 course.		
BIE-SP2	Team Software Project 2	KZ	6
Students gain hands-on	experience with the iterative development process while working on a large-scale software project. The first iteration is the res	sult of the BEI-SP	1 course project.
However, this time, the t	unctionality, testing and documenting of the system being developed will be emphasized. Students will work in teams of 4-6	people. The teach	ner, in the role of
the team and project lea	der, regularly consults with the team (at the seminars) with regard to the formal as well as material aspects of their solution.	The BEI-SI2 cour	se that runs
concurrently will provide	the students with supporting knowledge, especially in the area of teamwork, testing and quality assurance of the software p	roduct.	
BI-TS1	Theoretical Seminar I	Z	4
BI-TS2	Theoretical Seminar II	Z	4
BI-TS3	Theoretical Seminar III	Z	4
BI-TS4	Theoretical Seminar IV	Z	4
BIE-ADU.1	Unix Administration	Z,ZK	5
BIE-ADU	Unix Internals and Administration	Z,ZK	6
Students learn the intern	als of the UNIX operating system and the administration of its basic subsystems, and get practical skills on real-world examples	s. They understan	d the differences
between the user and ad	ministrator roles. They understand theoretically and know practically system monitoring, analysis and tuning tools; file systems in	mplementation an	d administration;
disk subsystems; proces	sses; memory; network services; shared file systems; naming services; remote access; system boot.		
BIE-TUR	User Interface Design	Z,ZK	4
Students have a basic of	verview of the methods for designing and testing common user interfaces. They have experience to solve the problems whe	re software and o	ther products do
not communicate with th	e user optimally, since the needs and characteristics of users are not taken into account during product development. Student:	s gain an overviev	v of the methods
that bring users into the	development process to ensure optimal communication with a user.		
BIE-AWD	Web and Database Server Administration	Z,ZK	4
	to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and		•
	ces. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representat	•	•
	entative of a complex and advanced open-source, community-developed software; MySQL as the most common database e	ngine to use with	the Apache web
server.			
BIE-WMM	Web and Multimedia	Z,ZK	5
	e presentation and user interaction side of web technologies. They understand the principles of proper HTML, CSS, and Jav		•
	and connecting a web application with a database. They are introduced to the techniques of processing multimedia that can b	e used on the wel	b, such as raster
graphics, video, and 3D	•	7.71	-
BIE-TWA	Web Application Design	Z,ZK	5
	sign and implement a complete web application (both the client side and the server side). Students learn to design and imple use technologies for effective and efficient client-server communication.	ment application	with secured
BIE-ADW	Windows Administration	Z,ZK	5
	e architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem		_
	rity tools, memory and filesystem management tools. Students understand the network layer and the implementation of netwo		
	er administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troubles	•	
Windows in heterogene		shoot probleme di	ia aariiiilotoi
BIE-3DT.1	3D Printing	KZ	4
· ·	three-dimensional objects optimized for printing on a RepRap printer and the printing itself. They will be able to design obje		•
in 3D.		, p	9
Codo of the ar	ours: DIE V/ DDO MC		
_	oup: BIE-V-PRO_MG	_	
Name of the gi	oup: Elective Courses, Suitable for those who intend to apply for Master	's program	n at FIT, in
English		. •	

Requirement credits in the group:

Requirement courses in the group:

Turing machine models and issues of NP-completeness and NP-hardness.

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 Jiřina Scholtzová Jiřina Scholtzová Pavel Tvrdík (Gar.)	Z,ZK	5	2+2	Z	V
BIE-GRA	Graph Algorithms and Complexity Theory Miroslav Balík	Z,ZK	5	2+2	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 de	sign and implement such algorithms, to use methods for analysing their computational and memory complexity. They unders	tand the sorting a	Igorithms with		
O(n.log n) time complex	ity, 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					

List of courses of this pass:

Completion Credits

Name of the course

Code

AE0B16FI1			
	Philosophy I e most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy.	KZ	4 tion of old
Tro dod. mar an	philosophical thoughts with recent problems of science, technology, economics and politics.	op.,, a oooo.	
BI-HMI	History of Mathematics and Informatics	Z,ZK	3
BI-OOP	Object-Oriented Programming	Z,ZK	4
	the pure object-oriented paradigm, being a tool for effective implementation of quality, evolvable business software systems. They will		
ney will learn how	to apply it for solving typical implementation tasks. Students will learn syntax and programming fundamentals of a pure OO open-sour	rce technology Ph	aro. Variou
BI-TS1	other modern programming languages utilising the OO concepts will be introduced in the subject, as well. Theoretical Seminar I	Z	4
BI-TS2	Theoretical Seminar II	Z	4
BI-TS3	Theoretical Seminar III	Z	4
BI-TS4	Theoretical Seminar IV	<u>Z</u>	4
BIE-3DT.1	3D Printing	KZ	4
	design three-dimensional objects optimized for printing on a RepRap printer and the printing itself. They will be able to design objects, in 3D.		
BIE-AAG	Automata and Grammars	Z,ZK	6
tudents are introd	duced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite a	automata, regular	expressions
	nars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages, relationships between for		
	red through the module is applicable in designs of algorithms for searching in text, data compression, simple parsing and translation,		
BIE-ADS	Network Administration	Z,ZK	5
-	e basic skills needed to administrate computer networks and to ensure their security. They understand and are able to practically use ecurity architecture of computer networks, routing protocols and backbone routing mechanisms, directory and naming services and ac		
dutionodion, of	networking equipment, secure client connections and secure data transfer, flow control mechanisms, and service availability mon	-	ou audit of
BIE-ADU	Unix Internals and Administration	Z,ZK	6
	internals of the UNIX operating system and the administration of its basic subsystems, and get practical skills on real-world examples. The		
etween the user a	nd administrator roles. They understand theoretically and know practically system monitoring, analysis and tuning tools; file systems imple		Iministration
DIE ADILA	disk subsystems; processes; memory; network services; shared file systems; naming services; remote access; system boo		
BIE-ADU.1	Unix Administration	Z,ZK	5
DIE 4 D144	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		5
	Windows Administration stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network as		standard
Students under and		ent mechanisms, nd security servic	standard es. Students
Students under idministration and know the method	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troubleshing windows in heterogeneous environments. Architectures of Computer Systems	ent mechanisms, nd security servic oot problems and Z,ZK	standard es. Students administer
Students under dministration and know the method BIE-APS students understate	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a sof user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining	ent mechanisms, nd security servic oot problems and Z,ZK g and memory hie	standard es. Students administer 6 rarchy. The
Students under dministration and know the method BIE-APS students understar now the main conditions.	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today.	standard es. Students administer 6 rarchy. The
Students under dministration and know the method BIE-APS students understantow the main concuse to increase pro-	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech ogram execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles of the standard of the standard of the principles of the processor.	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends	standard es. Students administer 6 rarchy. They s processors in computer
Students under dministration and know the method BIE-APS students understantow the main concuse to increase pro-	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends	standard es. Students administer 6 rarchy. They s processors in computer
Students under dministration and know the method BIE-APS students understantow the main concuse to increase pro-	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a sof user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech organ execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends	standard es. Students administer 6 rarchy. They s processors in computer
Students under administration and know the method BIE-APS Students understant and the main concuse to increase proceeding and the BIE-AWD Students are intrestant and the BIE-AWD Students are intrestant and the students are	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a sof user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech organ execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration reduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends understand the problems and Z,ZK backup complex s	standard es. Students administer 6 rarchy. They s processors in computer rinciples and 4 systems of
Students under dministration and know the method BIE-APS students understan now the main concise to increase prochitectures and harmonic BIE-AWD Students are intratabase and web	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a sof user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems Indicator architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech organ execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration	ent mechanisms, nd security service of problems and Z,ZK g and memory hie niques that today of modern trends understand the problems and Z,ZK backup complex sof a large comme	standard es. Students administer 6 rarchy. They s processors in computer rinciples and 4 systems of rcial system
Students under dministration and know the method BIE-APS tudents understantow the main consecto increase prochitectures and hard BIE-AWD Students are intratabase and web	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network at so of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech organe execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration oduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative epersentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engines.	ent mechanisms, nd security service of problems and Z,ZK g and memory hie niques that today of modern trends understand the problems and Z,ZK backup complex sof a large comme	standard es. Student: administer 6 rarchy. The sprocessors in computer rinciples and 4 systems of ricial systems
Students under dministration and know the method BIE-APS tudents understant now the main concise to increase prochitectures and hardward BIE-AWD Students are intratabase and web ostgreSQL as a rebile-BAP	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network at so of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech organe execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration oduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative epresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engines erver. Bachelor Theses	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends understand the problems of a large comment to use with the Z	standard es. Students administer 6 rarchy. These s processors in computer rinciples and 4 systems of rocial system Apache wel
Students under dministration and know the method BIE-APS students understar now the main concuse to increase prorchitectures and has base and web costgreSQL as a result of the BIE-BEZ students understar not has has functions	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system management security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troubleshed windows in heterogeneous environments. Architectures of Computer Systems Indicator of Carchitectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech organic execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles on will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration roduced to the administration of database and web services and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative epresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engine server. Bachelor Theses Security In the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric as a rope also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos properly and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal as properly and securely use cryptographic primitives and systems that	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends understand the problems of a large comment to use with the Z Z,ZK and asymmetric crystems for compu	standard es. Students administer 6 rarchy. They s processors in computei rinciples and 4 systems of rcial system Apache wel 14 6 rytosystems ter systems
Students under dministration and know the method BIE-APS tudents understant now the main consistent of increase processes and by the main consistent of the main	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system management security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network as of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems Indicator of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech organ execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration oduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative expresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engine server. Bachelor Theses Security Indicator of the security of the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric as a representative of the processor of the security and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal as security standards, social engineering, and basic principles of security management.	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends understand the property of a large comment to use with the ZZ,ZK and asymmetric crystems for compuspects of informat	standard es. Students administer 6 rarchy. They s processors in computer inciples and 4 systems of roial system Apache wel 14 6 /ptosystems ter systems ion security,
Students under dministration and know the method BIE-APS tudents understant now the main consistent of increase processed in the main consistent of the main con	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system management security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troubleshed windows in heterogeneous environments. Architectures of Computer Systems Indicator of Carchitectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech organic execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles on will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration roduced to the administration of database and web services and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative epresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engine server. Bachelor Theses Security In the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric as a rope also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos properly and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal as properly and securely use cryptographic primitives and systems that	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends understand the property of a large comment to use with the ZZ,ZK and asymmetric crystems for compuspects of informat Z,ZK	standard es. Students administer 6 rarchy. They s processors in computer inciples and 4 systems of roial system Apache wel 14 6 /ptosystems ter systems ion security,
Students under dministration and know the method BIE-APS students understain now the main consistent of increase processing the processing of the students are intratabase and web lostgreSQL as a result of the students understarned hash functions. They are able to public distribution of the students get the students understarned hash functions.	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a so of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems Indicator of Computer Systems Architectures of Computer Systems Architectures of Computer Systems Indicator of CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech orgam execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration oduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative epresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engineries enview. Bachelor Theses Security and the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric as a firely and securely use cryptography primitives and systems that are based on these primitives. Students are introduced to legal as security standards, social engineering, and basic principles of security management. Digital and Analog Circuits	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends understand the property of a large comment to use with the ZZ,ZK and asymmetric crystems for compuspects of informative analog and cover analog and cover problems.	standard es. Students administer 6 rarchy. They s processors in computer rinciples and 4 systems of recial system Apache web 14 6 reptosystems ter systems ion security, 5 tionality of
BIE-APS tudents understant on the main consecutive services and by the main consecutive services and web costgreSQL as a result of the main consecutive services and hash functions. They are able to public services and services and services services and service	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems Indicomputer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech ogram execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration oduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative epresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engines rever. Bachelor Theses Security In the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric as security standards, social engineering, and basic principles of security management. Digital and Analog Circuits In fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and circuits, and conductors. They are able to design simple circuits and evaluate circuit param	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends understand the property of a large commende to use with the ZZ,ZK and asymmetric crystems for compuspects of informative analog and control of Z,ZK principles of functiveen analog and control of the control of t	standard es. Students administer 6 rarchy. They s processors in computer rinciples and 4 systems of recial system Apache wet 14 6 ryptosystems ter systems ion security, 5 tionality of ligital modes
BIE-APS students understant on the main consecutive services and web ostgresQL as a result of the main services and web ostgresQL as a result of the main services and web ostgresQL as a result of the main services and web ostgresQL as a result of the main services and web ostgresQL as a result of the main services and the services are able to pure services and services and the services are services are services and the services are services are services are services and the services are services and the services are services are services are services and the services are services are services and the services are	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system management security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troubleshed windows in heterogeneous environments. Architectures of Computer Systems Indicate a computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech organic execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles organic execution speed. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration oduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative expresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engine server. Bachelor Theses Security at the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric as screen to the fundamentals of cryptography and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal as security standards, social engineering, and basic principles of security management. Digital and Analog Circuits fundamental understanding of technologies under	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends understand the property of a large comment to use with the ZZZK and asymmetric crystems for compuspects of informat Z,ZK principles of functiveen analog and cZ,ZK in to design small	standard es. Student administer 6 rarchy. The s processor in compute rinciples and 4 systems of rocial system Apache wel 14 6 rytosystems ter systems ion security 5 tionality of digital mode
BIE-APS students understant on the main consecutive services and web ostgresQL as a manner and hash functions. They are able to p. BIE-CAO Students get the ansistors, gates, we consider the services of the services and the services of th	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and fliesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech ogram execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration of database and web servers and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative epresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engines server. Bachelor Theses Security In the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric as server, and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal as security and securely use cryptographic primitives and systems that are based on these primitives. Students are introduced to legal as security and securely use cryptographic primitives and systems that are based on these primitives. St	ent mechanisms, nd security service oot problems and Z,ZK g and memory hie niques that today of modern trends understand the property of a large comment to use with the ZZ Z,ZK and asymmetric crystems for compuspects of informat Z,ZK principles of functiveen analog and c Z,ZK and design small SQL language, as	standard es. Student administer 6 rarchy. The s processor in compute rinciples an 4 systems of roial system Apache we 14 6 rytosystems ter systems ion security 5 tionality of digital mode 6 databases s well as wit
BIE-APS tudents understant on the main consistency and being	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and fliesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech orgame execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration oduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative epresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engine server. Bachelor Theses Security In the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric as a fine principle of security management. Digital and Analog Circuits In fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences betwe	ent mechanisms, nd security service of problems and Z,ZK g and memory hie niques that today of modern trends understand the process of a large comment to use with the ZZ,ZK and asymmetric crystems for compuspects of informat Z,ZK principles of functiveen analog and compute to design small SQL language, asymmetric concepts of the con	standard es. Student administer 6 rarchy. The s processor in compute rinciples an 4 systems of roial system Apache we 14 6 rotosystems ter systems ion security 5 tionality of digital mode 6 databases s well as wit of transactio
BIE-APS tudents understant on the main consistency and being	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and filesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems	ent mechanisms, nd security service of problems and Z,ZK g and memory hie niques that today of modern trends understand the process of a large comment to use with the ZZ,ZK and asymmetric crystems for compuspects of informat Z,ZK principles of functiveen analog and concepts of o special ways of special ways of security special ways of special ways of security s	standard es. Student administer 6 rarchy. The s processor in compute rinciples and 4 systems of rocial system Apache wel 14 6 rotosystems ter systems ion security 5 tionality of digital mode 6 databases s well as with f transaction storing data
Students under dministration and know the method BIE-APS students understain now the main consist to increase prochitectures and has been students are intratabase and web lostgreSQL as a roll billion billio	stand the architecture and internals of the Windows OS and acquire the skills to administer it. They are able to use system managem security tools, memory and fliesystem management tools. Students understand the network layer and the implementation of network a is of user administration, advanced ActiveDirectory administration, system migration, deployment, backup. They are able to troublesh Windows in heterogeneous environments. Architectures of Computer Systems and computer architectures with general-purpose processors at the level of machine instructions, with emphasis on instruction pipelining cepts of RISC and CISC architectures. They learn how modern computers work and how they are constructed. They learn about the tech orgame execution speed. They are able to optimize their programs to fully exploit the processor. They get an idea about the principles now will they affect software. They also understand the architectures of vector processors, their use in today's microprocessors. They architectures of shared-memory multiprocessor systems and the issues of memory consistency. Web and Database Server Administration oduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative epresentative of a complex and advanced open-source, community-developed software; MySQL as the most common database engine server. Bachelor Theses Security In the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric as a fine principle of security management. Digital and Analog Circuits In fundamental understanding of technologies underlying electronic digital systems. They understand the basic theoretical models and circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences betwe	ent mechanisms, nd security service of problems and Z,ZK g and memory hie niques that today of modern trends understand the process of a large comment to use with the ZZ,ZK and asymmetric crystems for compuspects of informat Z,ZK principles of functiveen analog and concepts of o special ways of special ways of security special ways of special ways of security s	standard es. Students administer 6 rarchy. They s processors in computer rinciples and 4 systems of recial system Apache wel 14 6 ryptosystems ter systems ion security, 5 tionality of digital modes s well as with f transaction storing data

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. Efficient Implementation of Algorithms Z.ZK **BIF-FIA** 5 Students learn to combine their programming skills (ability to design efficient algorithms) and HW knowledge (utilization of all available features of a particular processor and memory architecture). Students learn the basics of code tuning and optimization. **BIE-EKP Enterprise Economics** Students get common knowledge of business economics. They understand the goals and functions of a business, the business environment, and the business lifecycle. They understand the relationships among profit, production volume, price and costs. They have an overview of applicable taxes. They know the fundamentals of financial mathematics and investment decision making. They can draft and interpret a business plan. They understand management functions, corporate processes and corporate governance. **BIE-EPD Business Economics** Students get common knowledge of business economics. They understand the goals and functions of a business, the business environment, and the business lifecycle. They understand the relationships among profit, production volume, price and costs. They have an overview of applicable taxes. They know the fundamentals of financial mathematics and investment decision making. They can draft a business plan. They understand management functions, corporate processes and corporate governance **Business Economics** 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 Accounting and Corporate Finance Students understand the principles and have practical skills in corporate finance. They have a grasp of accounting principles and understand the concepts of assets and liabilities, costs, revenues and profit. They know the structure of financial statements and know how to analyze them. They are able to evaluate investments and understand the effect of inflation and taxes on investment decisions. **Financial Markets** Financial sector has been deeply transformed in the recent years, which led to a development of structured financial products, a new point of view 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. **BIE-GRA** Graph Algorithms and Complexity Theory 7 7K 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. **BIF-IMA** Introduction to Mathematics Students refresh and extend knowledge of elementary functions and their properties. Students understand basic mathematical principles and they are able to apply them in particular examples BIE-JPO Computer Units Z,ZK Students know the internal structure and organization of computer or processor components and their interfacing with the environment. They understand the organization of main memory and other internal memories (addressable, LIFO, FIFO and CAM). They know the organization of an arithmetic unit. They learn the design methodology for control units and controllers, as well as basic principles of communication with peripheral devices and buses. They understand the architecture of a bus system. BIE-LIN Linear Algebra Students understand the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependencies among components are only linear. They know the basic methods for operating with polynomials and linear spaces. They are able to perform matrix operations and solve systems of linear equations. They can apply these mathematical principles to solving problems in 2D or 3D analytic geometry. They understand error-detecting and error-correcting codes. Multimedia and Graphics Applications **BIE-MGA** Z,ZK 5 Students gain practical experience with applications for raster and vector 2D/3D graphics and DTP. They learn basic methods of creating and editing computer graphics. Students also learn the theoretical fundamentals of computer graphics. During the semester, students work on various parts of a complex project involving 2D/3D graphics and DTP. Fundamentals of Microeconomics 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 BIE-MLO Mathematical Logic Z,ZK An introduction to predicate logic, the standard language and deductive system of mathematics and computer science. **BIE-OMO** Object Modelling Z.ZK Students will practically master conceptual modelling of business structures, they will learn fundamentals of OntoUML notation and methodology. Students will learn fundamentals of pure object-oriented paradigm, i.e. terms object, method, message, class, class instance, composition, inheritance, collections. Students will learn to transform a conceptual model to object-oriented implementation model and they will learn fundamentals of pure object-oriented implementation in Smalltalk and pure object database. Students will learn to formulate rules and queries upon the object database. **BIF-OSY** 7.7K Operating Systems Students understand the classical theory of operating systems (OS) in addition to the knowledge gained in the BI-UOS module. They get a solid knowledge of OS kernels, processes and threads implementations. They understand the problems of race conditions and principles and algorithms for critical sections, thread scheduling, resource allocation, deadlocks. They understand the techniques of managing virtual memory, principles and architectures of disks and disk arrays, file systems and peripheral devices. They gain basic knowledge necessary for developing system applications or for system administration. They are able to design and implement simple multithreaded applications. Programming and Algorithmics 1 Students learn to construct algorithms for solving basic problems and write them in the C language. They understand data types (simple, structured, pointers), expressions, statements, functions, concept of recursion. They learn the basics of algorithm complexity analysis. They know fundamental algorithms for searching, sorting, and manipulating with linked lists. Programming and Algorithmics 2 BIF-PA2 7.7K Students know the instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, queue, enlargeable array, set, table). They can implement linked structures. They learn these skills using the programming language C++. Although this is not a module of programming in C++, students are introduced to all C++ features needed to achieve the main objective (e.g., operator overloading, templates).

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 an appropriate contract-based 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 intangible property. They have a good overview of the Czech Republic legislation as well as the EU legislation. **BIE-PGR** Computer Graphics Z,ZK Students are able to program a simple interactive 3D graphical application like a computer game or scientific visualisation, to design the scene, add textures imitating geometric details and materials (like wall surface, wood, sky), and set up the lighting. At the same time, they understand the fundamental principles and terms used in computer graphics, such as graphical pipeline, geometric transformations, or lighting model. They gain knowledge allowing orientation in computer graphics, and representing solid fundamentals for their professional development, e.g. for GPU programming and animations. They get used to techniques utilised in geometric modelling, modelling of curves and surfaces, and scientific visualisation. Programing in PHP Main goal of the course is an introduction to PHP - language and technology. Students will learn also best practices and will use tool that eases development in PHP. The course is recommended for students of BIE-WSI-WI.2015 branch of study and do not have required knowledge to register for BIE-TWA.1. They should register for this course in their 3rd semester of study. **BIE-PJP Programming Languages and Compilers** Z,ZK Students master basic methods of implementation of common high-level programming languages. They get experience with the design and implementation of individual compiler parts for a simple programming language: data types, subroutines, and data abstractions. Students are able to formally specify a translation of a text that has a certain syntax into a target form and write a compiler based on such a specification. The notion of compiler in this context is not limited to compilers of programming languages, but extends to all other programs for parsing and processing text in a language defined by a LL(1) grammar. **BIE-PJV** Programming in Java The course Programming in Java will introduce students to the object oriented programming in Java programming language. Beside of basics of Java language the fundamental library will also be presented. There are especially file, net, data structures, database and concurrent library. **BIE-PNO** Practical Digital Design K7 5 Students get an overview of the contemporary digital design flow and learn practical skills to use synchronous design techniques. They understand the basics of the VHDL language, and implementation technologies FPGA and ASIC. **BIE-PPR** Project, Presentation and Rhetorics (BIE-PPR) This subject is aimed to the professional communication and writing of the scientific texts (bachelor's and diploma thesis). Students will learn to create and prepare interactive presentations and presenting before an audience. Students will also learn to write technical reports and scientific texts. **BIE-PRP** Law and Business Z,ZK Students understand the basic issues when engaging in business activities in the CR and in the EU. Students learn to establish companies, gain necessary business permits, conclude commercial or civil contracts. Students also get acquainted with the principles of antitrust regulation and learn to resolve disputes in the area of business, labour, or civil relationships in courts. Programming in shell 2 Z,ZK Students get a general overview of scripting languages, introduction into syntax, semantics, programming style, pros and cons. In addition, they gain a deeper insight into Bourne Again shell and some other particular scripting languages and will get practical experience with shell script programming. Note to Erasmus students: Prior knowledge of topics from Programming in Shell 1 module is a prerequisite. Namely basic Bourne shell usage, as well as orientation in user filesystem tools (cp, In, mkdir, rm...) and some experience with data filtering (cut, tr, sort, uniq...). Even though it is possible to attend the classes without this knowledge, it may be difficult to follow the lectures and to complete all required tasks to pass this module without them. Computer Networks Students understand the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks focusing primarily the 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 network application and configure a simple network. Probability and Statistics Students are introduced to elements of probability thinking, ability of the synthesis both prior and posterior information and use to work with random variables. They will be able to apply correctly basic models of the distribution of random variables and to solve applied probability problems in the area of informatics and computer science. Using statistical inference methods, they master methods of statistical inference to estimate unknown population parameters on the basis of sample. They get acquainted with basic methods of the determination of possible statistical dependence of two or more random variables. **BIE-SAP** Z.ZK Computer Structures and Architectures 6 Students understand basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, inputs, outputs, data storage and transfer. In the labs, students gain practical experience with the design and implementation of the logic of a simple processor using modern digital design tools. Software Engineering I 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 parallel (only summer semester), the students can work on a single more complex project and they are classified to both courses for a single project. This course does not teach the students programming, nor any particular technology, framework or programming language. The students are required to have some knowledge of these to apply them on their team project. BIE-SI2 Software Engineering 2 Students will learn to work methodically with respect to software development methodic, especially Unified Process methodic and Unified Modeling Language (UML). They will understand the functions of individual roles in a typical software team, as well as get a practical experience with them in the concurrent BIE-SP2 module. Students will also get an idea about software testing and measuring software quality. This knowledge will get extended with a practical experience thanks to the concurrently running BIE-SP2 module. **BIE-SKJ** Scripting Languages Students get a general overview of scripting languages, introduction into syntax, semantics, programming style, pros and cons. In addition, they gain a deeper insight into UNIX shell and some other particular scripting languages and will get practical experience with shell script programming. Note to Erasmus students: Prior knowledge of topics from Programming in Shell 1 module is a prerequisite. Namely basic Bourne shell usage, as well as orientation in user filesystem tools (cp, ln, mkdir, rm...) and some experience with data filtering (cut, tr, sort, uniq...). Even though it is possible to attend the classes without this knowledge, it may be difficult to follow the lectures and to complete all required tasks to pass this module without them. Team Software Project 1 In 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 enrolled in parallel with BIE-SI1.2 course. BIE-SP2 ΚZ Team Software Project 2 Students gain hands-on experience with the iterative development process while working on a large-scale software project. The first iteration is the result of the BEI-SP1 course project. However, this time, the functionality, testing and documenting of the system being developed will be emphasized. Students will work in teams of 4-6 people. The teacher, in the role of

-	oject leader, regularly consults with the team (at the seminars) with regard to the formal as well as material aspects of their solution. Turrently will provide the students with supporting knowledge, especially in the area of teamwork, testing and quality assurance of the students.		that runs
BIE-SRC	Real-time Systems	KZ	4
	e basic knowledge in the Real-Time (RT) theory and in the design methods for RT systems including the dependability issues. Theret	_	
· .	ally verified on the practical labs of the Department of Digital Design. This subject is mainly based on embedded R-T systems, therefor the same as in BI-VES subject.		sign kits are
BIE-TED	Electronic Documentation Design	KZ	5
	e to create electronic documentation, namely technical reports. They learn alternatives of WYSIWYG editors and are able to produce		
	urable tools appropriate for ICT professionals. They learn the documentation of software projects, including basics of UML and docum		
BIE-TIS	Information Systems Design	Z,ZK	5
	n various ways and methods of design and implementation of information systems. They will gain overview in different kinds of ISs, a eas of their deployment. Students will also be able to consider customers' requirements on the IS and choose proper technologies fo		_
BIE-TUR	User Interface Design	Z,ZK	4
	asic overview of the methods for designing and testing common user interfaces. They have experience to solve the problems where s		•
	vith the user optimally, since the needs and characteristics of users are not taken into account during product development. Students ga	-	
	that bring users into the development process to ensure optimal communication with a user.		
BIE-TWA	Web Application Design	Z,ZK	5
Students are abl	e to design and implement a complete web application (both the client side and the server side). Students learn to design and implement	nent application with	n secured
	access, and are able to use technologies for effective and efficient client-server communication.		
BIE-UOS	Introduction to Operating System UNIX	KZ	5
	e advanced and knowledgeable users of common operating systems: UNIX, Linux, or MS Windows. They understand the fundament		
systems (file syste	ms, processes and threads, access rights, memory management, network interfaces). They gain the knowledge of advanced users, w	ith hands-on experi	ence of the
DIE VEC	shell, basic commands, and filters.	Z,ZK	
BIE-VES	Embedded Systems esign embedded systems and develop software for them. They get basic knowledge of the most common microcontrollers and embedd		5 r integrated
Students learn to d	peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools.	eu processors, triei	rintegrated
BIE-VWM	Searching Web and Multimedia Databases	Z,ZK	5
	c knowledge concerning retrieval techniques on the web, where the web environment is viewed as a large distributed and heterogenou		_
the students wil	I understand the techniques for retrieving text and hypertext documents (the web pages). Moreover, they will be aware of similarity re heterogenous multimedia databases (unstructured data collections, respectively).	trieval methods foc	used on
BIE-VZD	Data Mining	Z,ZK	4
	fuced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, multion		-
statistical techniqu	es of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships bet	ween model bias a	nd variance
and will 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-WMM	Web and Multimedia	Z,ZK	5
	ouse the presentation and user interaction side of web technologies. They understand the principles of proper HTML, CSS, and Javas pting and connecting a web application with a database. They are introduced to the techniques of processing multimedia that can be use		
003103 011 111 3011	graphics, video, and 3D graphics.	Sea on the web, say	on as raster
BIE-ZDM	Elements of Discrete Mathematics	Z,ZK	5
	a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula appro		-
_	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 a	are able to
use basic proof te	chiques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the line		egrals and
DIE 700	sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic ex		
BIE-ZRS	Basics of Systems Control	Z,ZK	4
	Basics of System Control is designed for anyone interested in applied computer science in bachelor studies. A brief introduction to the Lated by our graduates in the industrial practice. Students will gain knowledge in this rapidly evolving field of great future. We will focu		
=	ring and physical systems. We will provide basic information from the feedback control of linear dynamical SISO systems. We will tea	· ·	-
•	isic linear dynamic systems analysis and design verification, simple PID feedback, PSD and fuzzy controllers. This is a survey course		
methods of creatin	g a description of the system model, the basic linear dynamic systems analysis and design verification and simple PID feedback, PSD a	and fuzzy controller	s. Attention
is also given to se	nsors and actuators in control loops, issues of stability in control systems, single and continuous adjustment of the controller paramet	ters and certain asp	ects of the
industrial impler	nentation of continuous and digital controllers and PLC control. The themes of lectures are accompanied by a number of useful exam	ples and practical i	ndustrial
DIE 701	implementations.	771	
BIE-ZSI	Introduction to Software Engineering	Z,ZK	5
	understand formalized descriptions of analytic and design models in UML. To a limited extent, they take part in creating such models ects. Students should be able to discuss the models with other members of a software development team. This experience and skills en		-
	in such teams as members.		
BIE-ZUM	Artificial Intelligence Fundamentals	Z,ZK	4
	duced to the fundamental problems in the Artificial Intelligence, and the basic methods for their solving. It focuses mainly on the classical transfer and machine learning. Medars soft computing methods including the evolutionary classifity.		
space search, mur	ti-agent systems, game theory, planning, and machine learning. Modern soft-computing methods, including the evolutionary algorithm be presented as well.	s and the neural ne	tworks, Will
BIE-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
DIL-ZVVO	The course focuses on correct web design. It addresses technical aspects as well as correct user interface design.	<u>_</u> , <u>_</u> ,	7
FIE-HTE	History of Technology and Economics	ZK	2
	ices the scientific disciplines of history and technology, economic and social history of the Czech lands and Czechoslovakia in compa		
	the European region 10 to 21 century		

For updated information see http://bilakniha.cvut.cz/en/FF.html Generated: day 07. 10. 2016, time 15:11.