### Study plan

## Name of study plan: Bachelor branch Security and Information Technology, in Czech, part-time, 2015 - 2019

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Informatics, valid until 2024

Type of study: Bachelor combined

Required credits: 156 Elective courses credits: 24 Sum of credits in the plan: 180

Note on the plan: Tato verze studijního plánu je ur ena pro studenty, které byli p ijati ke studiu v akademických

rocích 2015/2016 až 2019/2020 do kombinované formy studia bakalá ského programu BI.

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 116

The role of the block: PP

Code of the group: BIK-PP.2015

Name of the group: Compulsory Courses of Bachelor Study Program Informatics, in Czech, Version 2015

Requirement credits in the group: In this group you have to gain 116 credits

Requirement courses in the group: In this group you have to complete at least 20 courses

Credits in the group: 116

přechodně jsou ve skupině vzálemně se vylučující předměty BIK-BPR a BI-BPR. Později zde Note on the group:

	zůstane pouze BI-BPR. Mezi oběma předm	iety je nastav	rena ekv	ivalence	:. T	
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members)  Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BIK-AG1	Algorithms and Graphs 1 Ji í Chludil	Z,ZK	6	14KP+4KC	Z	PP
BIK-AAG	Automata and Grammars Ond ej Guth	Z,ZK	6	13KP+4KC	Z	PP
BI-BAP	Bachelor Thesis Zden k Muziká Zden k Muziká (Gar.)	Z	14		L,Z	PP
BIK-BPR	Bachelor project Zden k Muziká Zden k Muziká (Gar.)	Z	2		Z,L	PP
BIK-BEZ	Security Ji í Dostál	Z,ZK	6	13KP+4KC	L	PP
BIK-CAO	Digital and Analog Circuits  Martin Da hel	Z,ZK	5	13KP+4KC	Z	PP
BIK-DBS	Database Systems Michal Valenta	Z,ZK	6	13KP+8KC	L	PP
BIK-DPR	Documentation, presentation, and rhetoric Ond ej Guth, Dana Vynikarová Dana Vynikarová (Gar.)	KZ	4	5ZP	L	PP
BIK-LIN	Linear Algebra Karel Klouda Karel Klouda (Gar.)	Z,ZK	7	26KP+4KC	L	PP
BIK-MLO	Mathematical Logic Karel Klouda Karel Klouda (Gar.)	Z,ZK	5	13KP+4KC	Z	PP
BIK-OSY	Operating Systems Michal Soch	Z,ZK	5	13KP+4KC	L	PP
BIK-PSI	Computer Networks	Z,ZK	5	13KP+4KC	L	PP
BIK-PST	Probability and Statistics  Daniel Vasata	Z,ZK	5	13KP+4KC	Z	PP
BIK-PA1	Programming and Algorithmics 1  Josef Vogel	Z,ZK	6	20KP+6KC	Z	PP
BIK-PA2	Programming and Algorithmics 2	Z,ZK	7	13KP+4KC	L	PP
BIK-PS1	Programming in Shell 1 Dana ermáková	KZ	5	13KP+4KC	Z	PP

	Software Engineering I  Ji í Mlejnek Ji í Mlejnek Ji í Mlejnek (Gar.)	Z,ZK	5	13KP+4KC	Z,L	PP
BIK-SAP	Computer Structure and Architecture  Martin Da hel	Z,ZK	6	13KP+4KC	L	PP
BIK-ZDM	Elements of Discrete Mathematics  Eva Pernecká Josef Kolá Josef Kolá (Gar.)	Z,ZK	5	13KP+4KC	Z	PP
BIK-ZMA	Elements of Calculus Ivo Petr Ivo Petr Tomáš Kalvoda (Gar.)	Z,ZK	6	20KP+4KC	Z	PP
	f the courses of this group of Study Plan: Code=BIK-PP.2015 Name=0	Compulsory	Course	s of Bach	elor Stu	dy Program
BIK-AG1 This course is presented	Algorithms and Graphs 1			Z	,ZK	6
BIK-AAG	Automata and Grammars			Z	,ZK	6
and regular grammars	ed to basic theoretical and implementation principles of the following topics: construction, use a , translation finite automata, construction and use of pushdown automata, hierarchy of formal lesseries for pattern matching, data compression, translation, simple parsing, and creation of digital constructions.	languages. Knov			_	
BI-BAP	Bachelor Thesis				Z	14
BIK-BPR	Bachelor project				Z	2
BIK-BEZ	Security				,ZK	6
and hash functions. Th	e mathematical fundamentals of cryptography and have an overview of current cryptographic algor ey also learn the fundamentals of secure programming and IT security, the fundamentals of deproperly and securely cryptographic primitives and systems that are based on these primitives.	esigning and us	-		-	
BIK-CAO	Digital and Analog Circuits				,ZK	5
-	imental understanding of technologies underlying electronic digital systems. The understand the					-
of electronic devices.	uits, and conductors. They are able to design simple circuits and evaluate circuit parameters. The	ney understand	tne amerer	ices between	analog an	a aigitai modes
BIK-DBS	Database Systems			7	.ZK	6
_	indicated by starting the detailed to the database engine architecture and typical user roles. They are briefly introduced to val	rious database r	models. The	1	, I	-
	straints) using a conceptual model and implement them in a relational database engine. They	-	-			
	on? the relational database model. They learn the principles of normalizing a relational database				-	
	parallel user access to a single data source, as well as recovering a database engine from a with respect to speed of access to large quantities of data. This introductory-level course doe	-	-	-	-	-
	pplications, distributed database systems, data stores.	S HOL COVEL. AUI	IIIIIStration	UI Ualabase	systems, u	ebugging and
BIK-DPR	Documentation, presentation, and rhetoric				ΚZ	4
	ed in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).					•
BUZINI	l. Al I					
BIK-LIN	Linear Algebra			Z	,ZK	7
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Students understand to linear. They know the b	he theoretical foundation of algebra and mathematical principles of linear models of systems a pasic methods for operating with matrices and linear spaces. They are able to perform matrix o	perations and s	olve syster	ndencies amo	ng compoi	nents are only
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BIK-SAP | Computer Structure and Architecture | Z,ZK | 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. The subject teaches basic knowledge of digital computer construction principles, how a computer performs its operations, what is machine code, and what are its connections to higher programming languages.

BIK-ZDM Elements of Discrete Mathematics

Z,ZK

5

Students get both a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula approximation, tools for solving recurrent equations, and basics of graph theory.

BIK-ZMA Elements of Calculus

Z,ZK

7 7K

Students acquire knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking and reasoning and are able to use basic proof techniques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the links between the integrals and

Name of the block: Compulsory courses of the specialization

Minimal number of credits of the block: 32

Unix Administration

The role of the block: PO

Code of the group: BIK-PO-BIT.2015

Name of the group: Compulsory Courses of Bc. Branch Security and IT, Part-Time Form, in English, Version

2015

BIK-ADI I 1

Requirement credits in the group: In this group you have to gain 32 credits

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

sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic expressions.

Credits in the group: 32

Note on the g	jioup.					
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BIK-ADU.1	Unix Administration	Z,ZK	5	14KP+4KC	L	PO
BIK-ADW.1	Windows Administration Miroslav Prágl	Z,ZK	4	14KP+2KC	Z	PO
BIK-APS.1	Architectures of Computer Systems Pavel Tvrdík	Z,ZK	5	14KP+4KC	Z	PO
BIK-BEK	Secure Code Róbert Lórencz	Z,ZK	5	14KP+4KC	L L	PO
BIK-HWB	Hardware Security Ji í Bu ek, Róbert Lórencz Ji í Bu ek Róbert Lórencz (Gar.)	Z,ZK	5	14KP+4KC	Z	PO
BIK-PAI	Law and Informatics  Zden k Ku era	ZK	3	13KP	Z	PO
BIK-SSB	System and Network Security	Z,ZK	5	14KP+4KC	Z	PO

## Characteristics of the courses of this group of Study Plan: Code=BIK-PO-BIT.2015 Name=Compulsory Courses of Bc. Branch Security and IT, Part-Time Form, in English, Version 2015

DII NDO. I	OTILA A GITTILI I STEALOTT	2,21	, 0	1	
Students became familia	ar with the internal structure of Unix-like systems, with the administration of their basic subsystems and with the principles of the	eir protection agai	nst unauthorized		
use. In the seminars the	y will verify the information from the lectures on real life examples from practice. They will understand the differences betwee	en user and admir	istrator roles.		
They gain theoretical an	d practical knowledge of tools for tracking, analyzing, debugging and securing systems, implementing and managing file syst	ems, disk subsyst	ems, processes,		
memory, network service	mory, network services, shared file systems, name services, remote access, and system boot.				
BIK-ADW 1					

BIK-ADW.1	Windows Administration	Z,ZK	4
This course is presente	d in Czech.		
BIK-APS.1	Architectures of Computer Systems	Z,ZK	5
This course is presente	d in Czech.		
BIK-BEK	Secure Code	Z,ZK	5

The students will learn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting familiar with the threat modeling theory, students gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every program needs to run with administrator privileges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing data and the relationships of security and database systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and the defense against them.

BIK-HWB	Hardware Security	7 7K	- 5
I DIN-UMD	Hardware Security		1 5

The course deals with hardware resources used to ensure security of computer systems including embedded ones. The students become familiar with the operating principles of cryptographic modules, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vulnerabilities of HW resources, including side-channel attacks and tampering with hardware during manufacture. Students will have an overview of contact and contactless smart card technology including applications and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of ciphers.

BIK-PAI	Law and Informatics	ZK	3
BIK-SSB	System and Network Security	Z,ZK	5
This course is focused	on selected areas of computer networks and computer systems in terms of cyber security		'

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: BIK-PV-EM.2015

Name of the group: Compulsory Elective Economics Bachelor Courses, Part-time Form of Study, in Czech,

Ver. 2015

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
BIK-MEK	Macroeconomic Context of Domestic and World Economy  Ivo Straka	KZ	4	13KP+2KC	L	VE
BIK-PRP	Law and Business Zden k Ku era	Z,ZK	4	13KP+4KC	L	VE
BIK-PRR.21	Project management David Pešek David Pešek Petra Pavlí ková (Gar.)	Z,ZK	5	14KP+4KC	Z	VE

Characteristics of the courses of this group of Study Plan: Code=BIK-PV-EM.2015 Name=Compulsory Elective Economics Bachelor Courses, Part-time Form of Study, in Czech, Ver. 2015

BIK-MEK	Macroeconomic Context of Domestic and World Economy	KZ	4				
This course is present	ed in Czech.	•					
BIK-PRP	Law and Business	Z,ZK	4				
Students understand the	ne basic issues when engaging in business activities in the CR and in the EU. Students learn to establish companies, gain necessity	essary business p	ermits, conclude				
commercial or civil cor	tracts. Students also get acquainted with the principles of antitrust regulation and learn to resolve disputes in the area of busi	ness, labour, or c	ivil relationships				
in courts.							
BIK-PRR.21	Project management	Z,ZK	5				
Project management n	Project management not only as a common dictionary and setting necessary processes while preparing and / or managing projects, but also as a social art. 20 years of experience not						
only in IT in various po	sitions and different projects available at your hands.						

Name of the block: Povinná zkouška z angli tiny

Minimal number of credits of the block: 2

The role of the block: PJ

Code of the group: BI-ZKA

Name of the group: English Language, Internal Certifica

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 4)

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

Credits in the group: 2

Note on the group:

Ze skupiny je nutné absolvovat jeden ze dvou předmětů, představujících interní zkoušku z angličtiny. -- Předmět BI-ANG si zapisují studenti, kteří absolvovali přípravné kurzy z angličtiny a mají zápočet z předmětu BI-A2L. -- Předmět BI--ANG1 si zapisují studenti, kteří se na zkoušku připravovali samostatně. Tito studenti musí před vlastní zkouškou absolvovat zápočtovou písemku.

		p p				
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-ANG1	English Language Examination without Preparatory Courses Kate ina Valentová Kate ina Valentová (Gar.)	Z,ZK	2		L	PJ
BIE-EEC	English language external certificate  Zden k Muziká Zden k Muziká Zden k Muziká (Gar.)	Z	4		L	PJ
BI-ANG	English Language, Internal Certificate  Kate ina Valentová Kate ina Valentová (Gar.)	ZK	2		Z,L	PJ

Characteristics of the courses of this group of Study Plan: Code=BI-ZKA Name=English Language, Internal Certifica

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

Name of the block: Compulsory elective humanities courses

Minimal number of credits of the block: 2

The role of the block: VH

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

Name of the group: Compulsory Elective Humanity Courses of Bc. Program Informatics, Part-time Form, in

Czech, Ver. 2015

Requirement credits in the group: In this group you have to gain at least 2 credits (at most 20)

Requirement courses in the group: In this group you have to complete at least 1 course (at most 9)

Credits in the group: 2

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
FI-FIL	Philosophy Peter Zamarovský Peter Zamarovský (Gar.)	ZK	2	2P	Z,L	VH
BIK-HMI	History of Mathematics and Informatics  Alena Šolcová Alena Šolcová (Gar.)	ZK	3	13KP+2KC	L	VH
FI-HTE	History of Technology and Economics  Jan Mikeš, Marcela Efmertová Jan Mikeš Jan Mikeš (Gar.)	ZK	2	2+0	Z,L	VH
FI-HPZ	Humanities subject from a study abroad  Miroslav Balík	Z	3	0+0	Z,L	VH
FI-MPL	Managerial Psychology	ZK	2	2+0	Z,L	VH
FI-KSA	Cultural and Social Anthropology  Jakub Šenovský	ZK	2	2P	L,Z	VH
BIK-KSA	Cultural and Social Anthropology Alena Libánská, Tomáš Houdek, Jakub Šenovský Jakub Šenovský Alena Libánská (Gar.)	ZK	2	13KP	L	VH
FI-ULI	Introduction to Linguistics for Computer Václav Cvr ek	ZK	2	2P	L	VH

Characteristics of the courses of this group of Study Plan: Code=BIK-PV-HU.2015 Name=Compulsory Elective Humanity Courses of Bc. Program Informatics. Part-time Form. in Czech. Ver. 2015

FI-FIL	Philosophy	ZK	2
see A0B16			
BIK-HMI	History of Mathematics and Informatics	ZK	3
This course is pre	sented in Czech.		
FI-HTE	History of Technology and Economics	ZK	2
The course introd	uces the scientific disciplines of history and technology, economic and social history of the Czech lands and Czechoslovakia in co	mparison with the	development o
the European regi	ion 19 to 21 century .		
FI-HPZ	Humanities subject from a study abroad	Z	3
A "Humanities sub	oject that has been studied abroad" is covered by the Humanities subject from a study abroad in Compulsory Humanities Module t	hat is required in the	ne curriculum.
The substitution is	s approved by the Vice-Dean for study affairs on behalf of the Dean at the request of the student.		
FI-MPL	Managerial Psychology	ZK	2
FI-KSA	Cultural and Social Anthropology	ZK	2
The one-semeste	r course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the dive	ersity of the world -	examples fron
anthropological re	search from our "exotic" cultures (topics: kinship, religion, social exclusion, migration, globalization, , material culture, language, h	ealth, history, death	n, etc) will be
shown. The course	e is an interesting alternative to other humanities, taught at FIT.		
BIK-KSA	Cultural and Social Anthropology	ZK	2
The one-semeste	r course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the dive	ersity of the world -	examples fron
anthropological re	search from our culture as well as from the "exotic" ones (topics: kinship, religion, social exclusion, migration, globalization, , materia	ıl culture, language	, health, history
death, etc). The	e course is an interesting alternative to other humanities, taught at FIT.		
FI-ULI	Introduction to Linguistics for Computer	ZK	2
This course is pre	sented in Czech.		

Name of the block: Elective courses
Minimal number of credits of the block: 0

The role of the block: V

Code of the group: BIK-V.2017

Name of the group: Purely Elective Courses of Bachelor Programme BI, Version 2017

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

Credits in the group: 0

#### Note on the group:

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Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BIK-STO	Storage and Filesystems Ji í Kašpar	Z,ZK	4	13KP+4KC	L,Z	V
BIK-EJA	Enterprise Java Ji í Dan ek	KZ	4	13KP+4KC	Z	V
BIK-HMI	History of Mathematics and Informatics  Alena Šolcová Alena Šolcová Alena Šolcová (Gar.)	ZK	3	13KP+2KC	L	V
BIK-SQL.1	Language SQL Michal Valenta Michal Valenta (Gar.)	KZ	4	13KP+4KC	L	V
BIK-OOP	Object-Oriented Programming Filip K ikava Filip K ikava Filip K ikava (Gar.)	Z,ZK	4	14KP+4KC	Z	٧
BIK-PJV	Programming in Java Jan Blizni enko <b>Jan Blizni enko</b> Jan Blizni enko (Gar.)	Z,ZK	4	13KP+4KC	Z	V
BIK-PRR.21	Project management David Pešek David Pešek Petra Pavlí ková (Gar.)	Z,ZK	5	14KP+4KC	Z	V
BIK-PKM	Introduction to Mathematics  Karel Klouda Tomáš Kalvoda (Gar.)	Z	4		Z	V
TVV	Physical education	Z	0	0+2	Z,L	V
TV1	Physical Education	Z	0	0+2	Z	V
TVV0	Physical education	Z	0	0+2	Z,L	V
TV2K1	Physical Education 2	Z	1		L	V
BIK-ZWU	Introduction to Web and User Interfaces Ji í Pavelka	Z,ZK	4	13KP+4KC	Z	V

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

Project management not only as a common dictionary and setting necessary processes while preparing and / or managing projects, but also as a social art. 20 years of experience no only in IT in various positions and different projects available at your hands.  BIK-HMI History of Mathematics and Informatics  This course is presented in Czech.  BIK-STO Storage and Filesystems The student will learn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and archiving, as so as storage scaling load balancing and high availability.  BIK-EJA Enterprise Java  Enterprise Java  KZ 4  The course covers Java technologies (Jakarta EE, Microprofile, etc.) which are used for the development of EIS (Enterprise Information Systems). These applications typically manage persistent data, are accessible to clients via the REST API and are created in the microservice architecture and deployed into orchestrated containers.  BIK-SQL.1 Language SQL  Course is based on knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In particular stored program unites triggers, recursive queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point of view of specialized database structures like indexes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan and possibilities of its. changes will be discussed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS and partially on PostgreSQL.  BIK-OOP  Object-Oriented Programming  BIK-PJV Programming in Java  This course is presented in Czech. However, there is an English variant in the full-time program Informatics (B1801 / 4753).  BIK-PVN Physical education  Z 0  TV1 Physical Education  Z 1  TV2 4	BIK-PRR.21	Project management	Z,ZK	5
BIK-HMI History of Mathematics and Informatics  ZK 3 This course is presented in Czech.  BIK-STO Storage and Filesystems The student will learn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and archiving, as so as storage scaling load balancing and high availability.  BIK-EJA Enterprise Java Enterprise Java He course covers Java technologies (Jakarta EE, Microprofile, etc.) which are used for the development of EIS (Enterprise Information Systems). These applications typically manage persistent data, are accessible to clients via the REST API and are created in the microservice architecture and deployed into orchestrated containers.  BIK-SQL.1 Language SQL Course is based on knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In particular stored program unites triggers, recursive queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point of view of specialized database structures like indexes, clusters, index-organized tables, and materialized views, as well as from the point of view query optimization. Execution plan and possibilities of its. changes will be discussed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS and partially on PostgreSQL.  BIK-OOP Object-Oriented Programming This course is presented in Czech. Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate togethe by message passing. In this course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software developmen including testing, error handing, refactoring and design patterns.  BIK-PKM Introduction to Mathematics TVV Programming in Java This course is presented in Czech. How	Project management n	ot only as a common dictionary and setting necessary processes while preparing and / or managing projects, but also as a s	social art. 20 years of	experience not
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BIK-EJA Enterprise Java Enterprise Information Systems). These applications typically manage persistent data, are accessible to clients via the REST API and are created in the microservice architecture and deployed into orchestrated containers.  BIK-SQL.1 Language SQL KZ 4  Course is based on knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In particular stored program unites triggers, recursive queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point of view of specialized database structures like indexes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan and possibilities of its. changes will be discussed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS and partially on PostgreSQL.  BIK-OOP Object-Oriented Programming This course is presented in Czech. Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate togethe by message passing. In this course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software development including testing, error handing, refactoring and design patterns.  BIK-PJV Programming in Java Z,ZK 4  This course is presented in Czech. However, there is an English variant in the full-time program Informatics (B1801 / 4753).  BIK-PKM Introduction to Mathematics Z 0  TVV Physical education Z 0  TVV Physical Education Z 0  TVV Physical education Z 0  Physical education Z 0  TVV0 Physical education Z 0	The student will learn p	rinciples and current solutions of storage systems architecture. The module explains principles of data store, protection, and	l archiving, as so as s	storage scaling,
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BIK-SQL.1 Language SQL Course is based on knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In particular stored program unites triggers, recursive queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point of view of specialized database structures like indexes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan and possibilities of its. changes will be discussed. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS and partially on PostgreSQL.  BIK-OOP Object-Oriented Programming Z,ZK 4  This course is presented in Czech. Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs of objects that collaborate togethe by message passing. In this course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical techniques for software development including testing, error handing, refactoring and design patterns.  BIK-PJV Programming in Java This course is presented in Czech. However, there is an English variant in the full-time program Informatics (B1801 / 4753).  BIK-PKM Introduction to Mathematics  Z 4  TVV Physical education Z 0  TVV Physical Education Z 0  TVVO Physical education Z 0				pically manage
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BIK-ZWU Introduction to Web and User Interfaces Z,ZK 4	BIK-ZWU	Introduction to Web and User Interfaces	Z,ZK	4
This course is presented in Czech.	This course is presente	od in Czech.		

Code of the group: BIK-BIT-VO.2017

Name of the group: Elective Vocational Courses for a Bachelor Branch BIK-BIT, Version 2017

Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0

Note on the group:

Všechny povinné předměty oborů a zaměření s výjimkou tohoto oboru

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BIK-ADS	Network Administration  Viktor erný	Z,ZK	5	13KP+4KC	Z	V
BIK-AWD	Web and Database Server Administration  Lukáš Ba inka	Z,ZK	4	13KP+4KC	L	٧
BIK-EFA	Efficient Algorithms Ji í Chludil	Z,ZK	5	13KP+4KC	Z	٧
BIK-EIA	Efficient Implementation of Algorithms Ivan Šime ek	Z,ZK	5	13KP+4KC	Z	V
BIK-GRA	Graph Algorithms Ji i Chludil	Z,ZK	5	13KP+4KC	, L	V
BIK-KOM	Conceptual Modelling Marek Suchánek, Michal Valenta, Robert Pergl, Mohamed Bettaz Robert Pergl Robert Pergl (Gar.)	Z,ZK	5	14KP+4KC	Z	٧
BIK-MGA	Multimedia and Graphics Applications  Lukáš Ba inka Lukáš Ba inka Lukáš Ba inka (Gar.)	Z,ZK	5	13KP+4KC	Z	V
BIK-OMO	Object Modeling Robert Pergl	Z,ZK	5	13KP+4KC	Z	٧
BIK-OOP	Object-Oriented Programming Filip K ikava Filip K ikava (Gar.)	Z,ZK	4	14KP+4KC	Z	V
BIK-PRP	Law and Business Zden k Ku era	Z,ZK	4	13KP+4KC	, L	V
BIK-PPA	Programming Paradigms	Z,ZK	5	14KP+4KC	Z	V
BIK-SI2.2	Software Engineering 2 Ji í Mlejnek	ZK	5	13KP	Z	٧
BIK-SI2.3	Software Engineering 2 Ji í Mlejnek Ji í Mlejnek Ji í Mlejnek (Gar.)	Z,ZK	3	14KP	Z	V
BIK-SP1	Team Software Project 1 Ji í Mlejnek	KZ	4	8KC	L	V
BIK-SP2	Team Software Project 2 Michal Valenta	KZ	6	12KC	Z	٧
BIK-SP2.1	Team Software Project 2 Ji í Mlejnek Ji í Mlejnek (Gar.)	KZ	4	12KC	Z	V
BIK-TJV	Java Technology Ond ej Guth	Z,ZK	4	14KP+4KC	Z	V
BIK-TIS	Information Systems Design	Z,ZK	5	13KP+2KC	Z	V
BIK-TUR	User Interface Design  Jan Schmidt	Z,ZK	4	13KP+4KC	, L	٧
BIK-VES	Embedded Systems Miroslav Skrbek	Z,ZK	5	13KP+4KC	L	V
BIK-VZD	Data Mining Pavel Kordík	Z,ZK	4	13KP+4KC	L	V

## Characteristics of the courses of this group of Study Plan: Code=BIK-BIT-VO.2017 Name=Elective Vocational Courses for a Bachelor Branch BIK-BIT, Version 2017

**BIK-PRP** 

Law and Business

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.

BIK-OOP Object-Oriented Programming Z,ZK 4

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

BIK-ADS | Network Administration | Z,ZK | 5
Students acquire basic skills needed to administrate computer networks, networking technologies, services, and to ensure their security. They understand and are able practically use

Ethernet technology, VLAN, authorisation, security architecture of computer networks, routing protocols and backbone routing mechanisms, directory and naming services and addressing, administration of networking equipment, secure client connections and secure data transfer, flow control mechanisms, and service availability monitoring.

BIK-AWD Web and Database Server Administration Z,ZK 4

Student in the branch "BI-IT Information technology" who lack the compulsory BIK-AWD course, ask the office of study affairs for enrolling an equivalent course BIK-AWD.1, which has a block lectures. Students are introduced to the administration of database and web servers and services. Students will be able to install, configure, maintain, test and backup complex systems of database and web services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a representative of a large commercial system; PostgreSQL as a representative of a complex and advanced open-source, community-developed software; MySQL as the most common database engine to use with the Apache web server.

BIK-EFA Efficient Algorithms Z,ZK 5

Students get a solid overview of efficient algorithms for solving classical algorithmic problems: selecting, searching, sorting, and other basic forms of reshaping and processing tree-like data structures. Students are able to design and implement such algorithms, to analyse their complexity, and to develop an optimised efficient algorithm under specific requirements or constraints. They are able to recognise a proper algorithm variant for any specific usage.

BIK-EIA Efficient Implementation of Algorithms Z,ZK 5

Student learn to combine their SW skills (efficient algorithms) and HW knowledge (utilization of all available features of the particular processor and memory architecture). Students learn the basics of code tuning.

seget an overview of typical usages of graph models in computing. They learn algorithmic methods of solution of graph problems, using the program EFA module. They understand algorithms for the key application domains of graph theory (flows in networks, heuristic search, approximation of costs). Students get basic competence in computer science background: they understand Turing machine models and issues of NP-completeness and DM Conceptual Modelling  GA Multimedia and Graphics Applications s gain practical experience with applications for 2D/3D graphics and DTP, as well as with basic methods of creating and editing computer graphics entals of computer graphics. During the semester, students work on various parts of a complex project involving 2D/3D graphics and DTP.  MO Object Modeling s will practically master conceptual modelling of business structures, they will learn fundamentals of OntoUML notation and methodology. Students ed-oriented paradigm, i.e. terms object, method, message, class, class instance, composition, inheritance, collections. Students will learn to transferented implementation model and they will learn fundamentals of pure object-oriented implementation in Smalltalk and pure object database.  PA Programming Paradigms see deals with basic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of particular mining paradigm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. The data calculus and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstrea C++ and Java.  2.2 Software Engineering 2 2.3 Software Engineering 2 2.3 Software Engineering 2 2.4 Team Software Project 1 5 again hands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided by the BE entity and that teaches the necessary techniques and theory. Teams consisting of 4	the BI-EFA module oblems). Students of IK-KOM IK-MGA cudents gain practical indamentals of complications will practical ure object-oriented problems.	view of typical usages of graph models in computing. They learn algorithmic methods of solution of graph problems, using the . They understand algorithms for the key application domains of graph theory (flows in networks, heuristic search, approximate the basic competence in computer science background: they understand Turing machine models and issues of NP-completer Conceptual Modelling  Multimedia and Graphics Applications all experience with applications for 2D/3D graphics and DTP, as well as with basic methods of creating and editing computer graphics. During the semester, students work on various parts of a complex project involving 2D/3D graphics and DTP.  Object Modeling  Illy master conceptual modelling of business structures, they will learn fundamentals of OntoUML notation and methodology. See the semester of	ition of complex protess and NP-hardne Z,ZK Z,ZK Z,ZK graphics. Students le	blems, matchiness.  5
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Students are introduced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, multidimensional data visualization, statistical techniques of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships between model bias and variance, and know the fundamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic data mining tools to common problems (classification, regression, clustering).

### List of courses of this pass:

Code	Name of the course	Completion	Credits		
BI-ANG	English Language, Internal Certificate	ZK	2		
Course information and teaching materials can be found at https://moodle-vyuka.cvut.cz/course/search.php?search=BI-ANG					
BI-ANG1	English Language Examination without Preparatory Courses	Z,ZK	2		
BI-BAP	Bachelor Thesis	Z	14		
BIE-EEC	English language external certificate	Z	4		
The BIE-ECC course can be recognized for any active semester after the submission of a certificate certificate that demonstrates their proficiency in English comparable to or exceeding					
	the B2 level of the Common European Framework of Reference for Languages.				
BIK-AAG	Automata and Grammars	Z,ZK	6		
Students are introd	Students are introduced to basic theoretical and implementation principles of the following topics: construction, use and mutual transformations of finite automata, regular expressions,				
and regular gramm	and regular grammars, translation finite automata, construction and use of pushdown automata, hierarchy of formal languages. Knowledge acquired through the module is applicable				

to creation of algorithms for pattern matching, data compression, translation, simple parsing, and creation of digital circuits.

	,		
BIK-ADS	Network Administration	Z,ZK	5
•	asic skills needed to administrate computer networks, networking technologies, services, and to ensure their security. They understar	-	
	ology, VLAN, authorisation, security architecture of computer networks, routing protocols and backbone routing mechanisms, directory	_	
	g, administration of networking equipment, secure client connections and secure data transfer, flow control mechanisms, and service	availability monitor	
BIK-ADU.1	Unix Administration	Z,ZK	5
	amiliar with the internal structure of Unix-like systems, with the administration of their basic subsystems and with the principles of their p	ŭ	
	ars they will verify the information from the lectures on real life examples from practice. They will understand the differences between		
They gain theoretic	al and practical knowledge of tools for tracking, analyzing, debugging and securing systems, implementing and managing file systems	, disk subsystems,	, processes,
504 45044	memory, network services, shared file systems, name services, remote access, and system boot.		
BIK-ADW.1	Windows Administration	Z,ZK	4
507.407	This course is presented in Czech.		
BIK-AG1	Algorithms and Graphs 1	Z,ZK	6
	This course is presented in Czech.		
BIK-APS.1	Architectures of Computer Systems	Z,ZK	5
	This course is presented in Czech.		
BIK-AWD	Web and Database Server Administration	Z,ZK	4
Student in the bran	ch "BI-IT Information technology" who lack the compulsory BIK-AWD course, ask the office of study affairs for enrolling an equivalent	course BIK-AWD.1	I, which has
a block lectures. St	udents are introduced to the administration of database and web servers and services. Students will be able to install, configure, main	tain, test and back	cup complex
•	se and web services. To provide a balanced overview, students will be introduced to three different database engines: Oracle as a repres	•	
system; Postgres	SQL as a representative of a complex and advanced open-source, community-developed software; MySQL as the most common data	base engine to us	e with the
	Apache web server.		
BIK-BEK	Secure Code	Z,ZK	5
	arn how to assess security risks and how to take them into account in the design phase of their own code and solutions. After getting fa		١
	gain practical experience with running programs with reduced privileges and methods of specifying these privileges, since not every	· -	
•	ileges. Dangers inherent in buffer overflows will be practically demonstrated. Students will be introduced to the principles of securing		
	database systems, web, remote procedure calls, and sockets in general. The module concludes with Denial of Service attacks and th		
BIK-BEZ	Security	Z,ZK	6
	ld the mathematical fundamentals of cryptography and have an overview of current cryptographic algorithms and applications: symmetric a	= = = = = = = = = = = = = = = = = = = =	
and hash functions	s. They also learn the fundamentals of secure programming and IT security, the fundamentals of designing and using modern cryptos	stems for comput	er systems.
	They are able to use properly and securely cryptographic primitives and systems that are based on these primitives.		
BIK-BPR	Bachelor project	Z	2
BIK-CAO	Digital and Analog Circuits	Z,ZK	5
Students get the	e fundamental understanding of technologies underlying electronic digital systems. The understand the basic theoretical models and p	orinciples of function	onality of
transistors, gates,	circuits, and conductors. They are able to design simple circuits and evaluate circuit parameters. They understand the differences betw	een analog and di	igital modes
	of electronic devices.		
BIK-DBS	Database Systems	Z,ZK	6
Students are intr	oduced to the database engine architecture and typical user roles. They are briefly introduced to various database models. They learn	n to design small d	latabases
	constraints) using a conceptual model and implement them in a relational database engine. They get a hands-on experience with the		
	lation? the relational database model. They learn the principles of normalizing a relational database schema. They understand the funda	•	
	lling parallel user access to a single data source, as well as recovering a database engine from a failure. They are briefly introduced to		-
in relational datab	ases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of databases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of databases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of databases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of databases with respect to speed of access to large quantities of data. This introductory-level course does not cover: Administration of databases with respect to speed of access to large quantities of data.	ase systems, debi	ugging and
DII ( DDD	optimizing database applications, distributed database systems, data stores.		
BIK-DPR	Documentation, presentation, and rhetoric	KZ	4
	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).		
BIK-EFA	Efficient Algorithms	Z,ZK	5
_	d overview of efficient algorithms for solving classical algorithmic problems: selecting, searching, sorting, and other basic forms of resh		-
data structures. S	tudents are able to design and implement such algorithms, to analyse their complexity, and to develop an optimised efficient algorithm	under specific red	quirements
	or constraints. They are able to recognise a proper algorithm variant for any specific usage.		
BIK-EIA	Efficient Implementation of Algorithms	Z,ZK	5
Student learn to d	ombine their SW skills (efficient algorithms) and HW knowledge (utilization of all available features of the particular processor and me	mory architecture	). Students
	learn the basics of code tuning.		
BIK-EJA	Enterprise Java	KZ	4
	Java technologies (Jakarta EE, Microprofile, etc.) which are used for the development of EIS (Enterprise Information Systems). These		ally manage
	sistent data, are accessible to clients via the REST API and are created in the microservice architecture and deployed into orchestrat		
BIK-GRA	Graph Algorithms	Z,ZK	5
-	erview of typical usages of graph models in computing. They learn algorithmic methods of solution of graph problems, using the progra	-	
	ule. They understand algorithms for the key application domains of graph theory (flows in networks, heuristic search, approximation of		-
	students get basic competence in computer science background: they understand Turing machine models and issues of NP-complete		
BIK-HMI	History of Mathematics and Informatics	ZK	3
	This course is presented in Czech.		
BIK-HWB	Hardware Security	Z,ZK	5
	s with hardware resources used to ensure security of computer systems including embedded ones. The students become familiar with		
	ules, the security features of modern processors, and storage media protection through encryption. They will gain knowledge about vu		
including side-char	and related topics for multi-factor outboatiestics, (biometrics). Students will have an overview of contact and contactless smart card tec		applications
DIK KOM	and related topics for multi-factor authentication (biometrics). Students will understand the problems of effective implementation of		
BIK-KOM	Conceptual Modelling	Z,ZK	5
BIK-KSA	Cultural and Social Anthropology	ZK	2
	course aims to acquaint students with the basics of social and cultural anthropology as a scientific discipline dealing with the diversity		
anthropological res	earch from our culture as well as from the "exotic" ones (topics: kinship, religion, social exclusion, migration, globalization, , material cul	ture, language, he	aith, history,
	death, etc). The course is an interesting alternative to other humanities, taught at FIT.		

BIK-LIN	Linear Algebra	Z,ZK	7
	nd the theoretical foundation of algebra and mathematical principles of linear models of systems around us, where the dependencies		
•	he basic methods for operating with matrices and linear spaces. They are able to perform matrix operations and solve systems of line	•	y can apply
BIK-MEK	hese mathematical principles to solving problems in 2D or 3D analytic geometry. They understand the error-detecting and error-corre  Macroeconomic Context of Domestic and World Economy	KZ	4
DIK-WEK	This course is presented in Czech.	I\Z	7
BIK-MGA	Multimedia and Graphics Applications	Z,ZK	5
Students gain prac	tical experience with applications for 2D/3D graphics and DTP, as well as with basic methods of creating and editing computer graph	ics. Students learn	theoretical
	undamentals of computer graphics. During the semester, students work on various parts of a complex project involving 2D/3D graphi		
BIK-MLO	Mathematical Logic	Z,ZK	5
	wledge of the syntax and semantics of the propositional and predicate logic. They master the Boolean algebra, both theoretically as an sa tool to describe the world of digital systems. They get skills to handle Boolean functions, normal forms, maps, and minimisation m		- 1
and practically ac	modules.		
BIK-OMO	Object Modeling	Z,ZK	5
•	ically master conceptual modelling of business structures, they will learn fundamentals of OntoUML notation and methodology. Stude		
	d paradigm, i.e. terms object, method, message, class, class instance, composition, inheritance, collections. Students will learn to tra Diementation model and they will learn fundamentals of pure object-oriented implementation in Smalltalk and pure object database. S	•	
object-onemed imp	rules and queries upon the object database.	itudents will learn i	o ioiiiidiate
BIK-OOP	Object-Oriented Programming	Z,ZK	4
This course is prese	ented in Czech. Object-oriented programming has been used in the last 50 years to solve computational problems by using graphs of ol	jects that collabor	ate together
by message passin	g. In this course we look at some of the main principles of object-oriented programming and design. The emphasis is on practical technic	ques for software o	levelopment
BIK-OSY	including testing, error handing, refactoring and design patterns.  Operating Systems	Z,ZK	5
	Operating Systems and the classical theory of operating systems (OS) in addition to the knowledge gained in the module "Programming in Shell 1". They		
	ses and threads implementations. They understand the problems of race conditions, thread scheduling, resource allocation and dead	•	٠ ا
managemer	nt of virtual memory, principles and architectures of disks, RAID and file systems. They are able to design and implement simple mult	ithreaded applicat	ons.
BIK-PA1	Programming and Algorithmics 1	Z,ZK	6
=	ability to formulate algorithms for solving basic problems and write them in the C language. They understand data types (simple, struc ons, concept of recursion. They learn to analyse simple cases of algorithm complexity. They know fundamental algorithms for searchi		
statements, function	with linked lists.	ng, sorting, and m	ariipulatirig
BIK-PA2	Programming and Algorithmics 2	Z,ZK	7
Students know the	e instruments of object-oriented programming and are able to use them for specifying and implementing abstract data types (stack, q	ueue, enlargeable	array, set,
table).They can imp	plement linked structures. They learn these skills using the programming language C++. Although this is not a module of programming in	n C++, students are	e introduced
BIK-PAI	with all C++ features needed to achieve the main objective (operator overloading, templates).  Law and Informatics	ZK	3
BIK-PJV	Programming in Java	Z,ZK	4
DIK 10V	This course is presented in Czech. However, there is an English variant in the full-time program Informatics (B1801 / 4753)		
BIK-PKM	Introduction to Mathematics	Z	4
	This course is presented in Czech.		
BIK-PPA	Programming Paradigms with basic paradigms of high-level programming languages, including their basic execution models, benefits, and limitations of partic	Z,ZK	5 Eupotional
	tigm and its basic principles are explained in details. Logic programming is introduced as another way of declarative programming. Th		
	s and on Lisp (Racket) and Prolog programming languages. Moreover, usage of these principles is demonstrated on modern mainstr		
	such as C++ and Java.		
BIK-PRP	Law and Business	Z,ZK	4
	nd the basic issues when engaging in business activities in the CR and in the EU. Students learn to establish companies, gain necessary contracts. Students also get acquainted with the principles of antitrust regulation and learn to resolve disputes in the area of busines	-	
commercial or own	in courts.	o, labour, or orvir re	Jaconompo
BIK-PRR.21	Project management	Z,ZK	5
Project manageme	nt not only as a common dictionary and setting necessary processes while preparing and / or managing projects, but also as a social	art. 20 years of exp	berience not
DU/ 50/	only in IT in various positions and different projects available at your hands.	147	
BIK-PS1	Programming in Shell 1 advanced and knowledgeable users of common UNIX-like operating systems. They understand the fundamental principles of the operating systems.	KZ	5 o systems
	advanced and knowledgeable users of common only-like operating systems. They understand the number that principles of the operating systems. They draw advanced users, with hands-on experience		
,	and filters.	, , , , , , , , , , , , , , , , , , , ,	,
BIK-PSI	Computer Networks	Z,ZK	5
	nd the basic common techniques, protocols, technologies, and algorithms necessary to communicate in computer networks. The topic		
2nd to 4th layer o	of the ISO OSI model. They also get a basic understanding of communication media, security, and network administration. Students v network application and configure a simple network.	will be able to write	a simple
BIK-PST	Probability and Statistics	Z,ZK	5
	uced to elements of probability thinking, ability of the synthesis both prior and posterior information and use to work with random varia		
	odels of the distribution of random variables and to solve applied probability problems in the area of informatics and computer science		
methods, they mast	ter methods of statistical inference to estimate unknown population parameters on the basis of sample. They get acquainted with basic	methods of the de	etermination
BIK-SAP	of possible statistical dependence of two or more random variables.  Computer Structure and Architecture	Z,ZK	6
	ind basic digital computer units and their structures, functions, and hardware implementation: ALU, control unit, memory system, inputer structures.		
	s, students gain practical experience with the design and implementation of the logic of a simple processor using modern digital desi	•	-
basic knowledge	of digital computer construction principles, how a computer performs its operations, what is machine code, and what are its connect	ions to higher prog	ramming
	languages.		

BIK-SI1.2			1
	Software Engineering I	Z,ZK	5
	he methods of analysis and design of large software systems, which are typically designed and implemented in teams. They get pract and design of a large-scale software project that is to be developed within the concurrent BI-SP1 module. They get skill to use CASE		
	solving software-related problems. They get overview of object-oriented analysis, design, architecture, validation, verification, and test		or modelling
BIK-SI2.2	Software Engineering 2	ZK	5
BIK-SI2.3	Software Engineering 2	Z,ZK	3
5.11 0.2.0	This course is presented in Czech. However, there is an English variant in the program Informatics (B1801 / 4753).	_,	
BIK-SP1	Team Software Project 1	KZ	4
_	ands-on experience with the analysis, design, and prototyping of a large-scale software system. Theoretical support is provided by the		
=	hat teaches the necessary techniques and theory. Teams consisting of 4-6 students will work on a specific project. The teacher, in the		
leader, regularly c	onsults with the team (at the seminars) with respect to both the formal and material aspects of the design. The resulting work will be further in the BEI-SP2 course.	irtner developed	and finished
BIK-SP2	Team Software Project 2	KZ	6
_			-
_	the functionality, testing and documenting of the system being developed will be emphasized. Students will work in teams of 4-6 people will be emphasized.		
the team and pro	ject leader, regularly consults with the team (at the seminars) with regard to the formal as well as material aspects of their solution. The	ne BEI-SI2 cours	e that runs
	rrently will provide the students with supporting knowledge, especially in the area of teamwork, testing and quality assurance of the s		
BIK-SP2.1	Team Software Project 2	KZ	4
BIK-SQL.1	Language SQL	KZ	4
	knowledge obtained in BI-DBS. Students become familiar with advanced relational and non-relational features of SQL language. In particular solutions of the property of the pr	•	-
	queries, OLAP support, object-relational constructions. Part of the course is dedicated to practical database optimization from the point o exes, clusters, index-organized tables, and materialized views. as well as from the point of view query optimization. Execution plan an		
	d. Lectures will usually discuss SQL standard, but many features will be demonstrated on Oracle DBMS. Seminars are based on Oracle DBMS.	•	•
	PostgreSQL.	·	,
BIK-SSB	System and Network Security	Z,ZK	5
	This course is focused on selected areas of computer networks and computer systems in terms of cyber security		'
BIK-STO	Storage and Filesystems	Z,ZK	4
The student will lea	rn principles and current solutions of storage systems architecture. The module explains principles of data store, protection, and archive	/ing, as so as sto	rage scaling,
	load balancing and high availability.		
BIK-TIS	Information Systems Design	Z,ZK	5
Students know var	ious types of ISs and their practical implementation aspects and are able to match the needs of different market segments (customers technologies (databases, programming languages, GUI etc.).	s) with application	is of existing
BIK-TJV	Java Technology	Z,ZK	4
	s to introduce the programming language Java. The student gains practical experiences for smaller enterprise application programmin		1
	and more layers enterprise systems. The student practically exercises all communication interfaces for each layers (JDBC, RestWeb		
	course end is student able to create three layers enterprise application.		
BIK-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 so		•
not communicate v	ith 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.	in an overview of	tne metnods
BIK-VES	Embedded Systems	Z,ZK	5
_	esign embedded systems and develop software for them.They get basic knowledge of the most common microcontrollers and embedde	•	-
	peripheral circuits, programming methods, and applications. They get practical skills with development kits and tools.	. ,	
BIK-VZD	Data Mining	Z,ZK	4
	uced to the basic methods of discovering knowledge in data. In particular, they learn the basic techniques of data preprocessing, multid	limanajanal data	
etatictical technique	es of data transformation, and fundamental principles of knowledge discovery methods. Students will be aware of the relationships betw		visualization,
•		veen model bias a	visualization, and variance,
•	ndamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic data	veen model bias a	visualization, and variance,
and know the fu	ndamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic data problems (classification, regression, clustering).	veen model bias a ata mining tools to	visualization, and variance, o common
and know the fu	ndamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic data problems (classification, regression, clustering).  Elements of Discrete Mathematics	veen model bias a ata mining tools to Z,ZK	visualization, and variance, o common
and know the fu	ndamentals of assessing model quality. Data mining software is extensively used in the module. Students will be able to apply basic data problems (classification, regression, clustering).	veen model bias a ata mining tools to Z,ZK	visualization, and variance, o common
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BIK-ZDM Students get both BIK-ZMA Students acquire use basic proof to	a mathematical sound background, but also practical calculations, and basics of graph theory.  Elements of Discrete Mathematics  a mathematical sound background, but also practical calculation skills in the area of combinatorics, value estimation and formula apprecurrent equations, and basics of graph theory.  Elements of Calculus  knowledge and understanding of the fundamentals of classical calculus so that they are able to apply mathematical way of thinking archinques. They get skills to practically handle functions of one variable in solving the problems in informatics. They understand the line sums of sequences. They are able to estimate lower or upper bounds of values of real functions and to handle simple asymptotic expression.	zeen model bias a ata mining tools to Z,ZK proximation, tools Z,ZK and reasoning and the bressions.	visualization, and variance, to common 5 for solving 6 are able to stegrals and
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FI-ULI	Introduction to Linguistics for Computer	ZK	2
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TV1	Physical Education	Z	0
TV2K1	Physical Education 2	Z	1
TVV	Physical education	Z	0
TVV0	Physical education	Z	0

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