Study plan

Name of study plan: Cybernetics and Robotics 2016

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Common courses

Garantor of the study branch: Program of study: Welcome page Type of study: unknown full-time

Required credits: 174
Elective courses credits: 6
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: 154

The role of the block: P

Code of the group: 2015_BKYRBAP Name of the group: Bachelor Project

Requirement credits in the group: In this group you have to gain 16 credits Requirement courses in the group: In this group you have to complete 1 course

Credits in the group: 16 Note on the group:

	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BBAP16	Bachelor Thesis	Z	16	15s	L,Z	Р

Characteristics of the courses of this group of Study Plan: Code=2015_BKYRBAP Name=Bachelor Project

PRAD16 Pacholor Thosis 7 16				
DDAF 10 Dacheol Hesis 2 10	BBAP16	Bachelor Thesis	Z	16

Code of the group: 2015_BKYRBBE

Name of the group: Safety of the bachelor's studies

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 2 courses

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BEZB	Safety in Electrical Engineering for a Bachelor's Degree Ivana Nová, Radek Havlíček, Vladimír Kůla Radek Havlíček Vladimír Kůla (Gar.)	Z	0	2BP+2BC	Z,L	Р
BEZZ	Basic Health and Occupational Safety Regulations Ivana Nová, Radek Havlíček, Vladimír Kůla Radek Havlíček Vladimír Kůla (Gar.)	Z	0	2BP+2BC	Z	Р

Characteristics of the courses of this group of Study Plan: Code=2015_BKYRBBE Name=Safety of the bachelor's studies

BEZB Safety in Electrical Engineering for a Bachelor's Degree Z 0
The purpose of the safety course is to give the students basic knowledge of electrical equipment and installation as to avoid danger arising from operation of it. This introductory course contains fundamentals of Safety Electrical Engineering. In this way the students receive qualification of instructed person that enables them to work on electrical equipment.

BEZZ Basic Health and Occupational Safety Regulations Z 0

The guidelines were worked out based on The Training Scheme for Health and Occupational Safety designed for employees and students of the Czech Technical University in Prague, which was provided by the Rector's Office of the CTU. Safety is considered one of the basic duties of all employees and students. The knowledge of Health and Occupational Safety regulations forms an integral and permanent part of qualification requirements. This program is obligatory.

Code of the group: 2015_BKYRP

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain 138 credits

Requirement courses in the group: In this group you have to complete 25 courses

Credits in the group: 138

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
B3B04PSA	Academic Writing Petra Juna Jennings, Jitka Pinková Jitka Pinková Petra Juna Jennings (Gar.)	KZ	2	2C	Z	Р
B3B33ALP	Algorithms and Programming Vojtěch Vonásek Vojtěch Vonásek (Gar.)	Z,ZK	6	2P+2C	Z	Р
B0B35APO	Computer Architectures Petr Štěpán, Pavel Píša, Richard Šusta Pavel Píša Pavel Píša (Gar.)	Z,ZK	5	2P+2L	L	Р
B3B35ARI	Automatic Control	Z,ZK	7	4P+2L	L	Р
B0B01DRN	Differencial Equations and Numerical Analysis Petr Habala, Jakub Rondoš, Jakub Staněk, Daniel Gromada, Josef Dvořák Petr Habala Petr Habala (Gar.)	Z,ZK	4	2P+2C	L	Р
B3B31EPO	Electronic Devices and Circuits Jiří Hospodka, Ondřej Brunner, Jan Havlík Jiří Hospodka Jiří Hospodka (Gar.)	Z,ZK	6	4P+2L	Z	Р
B3B02FY1	Physics 1 Michal Bednařík, Petr Koníček Michal Bednařík Michal Bednařík (Gar.)	Z,ZK	6	4P+1L+2C	L	Р
B3B02FY2	Physics 2 Michal Bednařík, Petr Koníček, Vojtěch Jandák, Marek Brothánek Michal Bednařík Michal Bednařík (Gar.)	Z,ZK	6	3P+1L+2C	Z	Р
B3B01KAT	Complex Analysis and Transformations Martin Bohata	Z,ZK	7	4P+2S	Z	Р
B3B38KDS	Communication and Distributed Systems	Z,ZK	6	4P+2L	Z	Р
B3B33KUI	Cybernetics and Artificial Intelligence Tomáš Svoboda, Petr Pošík Tomáš Svoboda Tomáš Svoboda (Gar.)	Z,ZK	6	2P+2C	L	Р
B0B01LAG	Linear Algebra Jakub Rondoš, Daniel Gromada, Jiří Velebil, Natalie Žukovec, Matěj Dostál Jiří Velebil Jiří Velebil (Gar.)	Z,ZK	8	4P+2S	Z	Р
B0B35LSP	Logic systems and processors Richard Susta, Martin Hlinovský Martin Hlinovský Zdeněk Hurák (Gar.)	Z,ZK	6	2P+2L	L	Р
B0B01LGR	Logic and Graphs Natalie Žukovec, Matěj Dostál, Alena Gollová Matěj Dostál Marie Demlová (Gar.)	Z,ZK	5	3P+2S	Z,L	Р
B0B01MA1	Mathematical Analysis 1 Josef Dvořák, Martin Křepela, Josef Tkadlec, Veronika Sobotíková Josef Tkadlec Josef Tkadlec (Gar.)	Z,ZK	7	4P+2S	Z,L	Р
B0B01MA2	Mathematical Analysis 2 Martin Bohata, Miroslav Korbelář, Petr Hájek, Jaroslav Tišer, Karel Pospíšil, Paola Vivi, Hana Turčinová Martin Bohata Jaroslav Tišer (Gar.)	Z,ZK	7	4P+2S	L,Z	Р
B0B33OPT	Optimization Tomáš Werner, Petr Olšák, Mirko Navara, Tomáš Kroupa Tomáš Kroupa Tomáš Werner (Gar.)	Z,ZK	7	4P+2C	Z,L	Р
B0B01PST	Probability and Statistics Jakub Staněk, Kateřina Helisová Kateřina Helisová (Gar.)	Z,ZK	7	4P+2S	Z	Р
B3B04PRE	Presentation Skills Petra Juna Jennings, Jitka Pinková Jitka Pinková Petra Juna Jennings (Gar.)	KZ	2	2C	L	Р
B3B36PRG	Programming in C Jan Faigl Jan Faigl (Gar.)	Z,ZK	6	2P+2C	L	Р
B3BPROJ4	Bachelor Project Petr Pošík, Jana Kostlivá, Martin Hlinovský, Jana Zichová, Drahomíra Hejtmanová, Martin Šipoš, Tomáš Drábek, Kamila Krupková Martin Hlinovský (Gar.)	Z	4	4s	Z	Р
B3B35RO	Robots	KZ	2	1P+2L	Z	Р
B3B33ROB	Robotics	Z,ZK	5	2P+2L	Z	Р
B3B38SME	Sensors and Measurements	Z,ZK	6	3P+2L	L	Р
B3B31SAS	Signals and Systems	Z,ZK	5	2P+2C	Z	Р

Characteristics of the courses of this group of Study Plan: Code=2015_BKYRP Name=Compulsory subjects of the programme

B3B04P5A	Academic writing	i nz i	2			
Practically focused course in which students learn how or improve their ability to correctly and effectively formulate common written documents such as their own notes, research,						
reports, protocols, article	es, etc. Students will be acquainted with the main principles of writing professional texts.					
B3B33ALD	Algorithms and Programming	7 7K	6			

This subject will give students a basic understanding of algorithms and programming and teach them to design, implement and test algorithms for simple tasks. The students will understand the notion of computational complexity. They will learn about basic program building blocks such as loops, conditional statements, variables, functions and recursion. We will introduce the most often used data structures (queue, stack, list, array etc) and operations on them. We will show the basic algorithms, for example for searching and sorting. Students will learn to write simple programs in Python.

B0B35APO	Computer Architectures	Z,ZK	5
33B35ARI	Automatic Control	Z.ZK	7
	automatic control. Introduction to basic concepts and properties of dynamic systems of physical, engineering, biological, econ	1 ' 1	•
	s of feedback and its use as a tool for altering the behavior of systems and managing uncertainty. Classical and modern meth		
itomatic control syste	ems. Students specialized in systems and control will build on these ideas and knowledge in the advanced courses to follow.	Students of other b	ranches and
ograms will find out	that control is an inspiring, ubiquitous and entertaining field worth of a future cooperation. Students? creativity is developed in	our laboratories.	
0B01DRN	Differencial Equations and Numerical Analysis	Z,ZK	4
his course introduces	s students to the classical theory of ordinary differential equations (separable and linear ODEs) and also to bsics of numerical n	methods (errors in	calculations a
ability, numerical sol	utions of algebraic and differential equations and their systems). The course takes advantage of the synnergy between theore	tical and practical	point of view.
3B31EPO	Electronic Devices and Circuits	Z,ZK	6
	s students to the basic principles and methods of analysis of electrical circuits. Defines the circuit elements and gives their elements are given their elements are given their elements.		
	of electronic systems based on analog as well as digital circuits. The course presents operational principles and methods of an	alysis of these circ	uits with respe
	ics and control systems.	, ,	
3B02FY1	Physics 1	Z,ZK	6
	nysics at the Faculty of Electrical Engineering - Physics 1, is devoted to the introduction into two important areas of physics. The		
	the electric and magnetic field. Within the framework of the classical mechanics, the students study the particle kinematics; dyn		-
•	rigid bodies. The students should be able to solve basic problems dealing with the description of mechanical systems, which t	=	_
	mechanics is followed by the relativistic mechanics, electric and magnetic field - both stationary as well as non-stationary. The		_
onsecutive course Ph	udy of electrical circuits, theory of electrotechnical materials or radioelectronics. Apart of this, the knowledge gained in this countries?	urse is required for	the study of t
3B02FY2		Z.ZK	
	Physics 2	1 ' 1	6 Following topi
-	is closely linked with the course Physics 1. Within the framework of this course the students will first of all learn foundations of will give to the students basic insight into the properties of waves and will help to the students to understand that the present	-	
-	spite of the waves character. Particular types of waves, such as acoustic or optical waves are the subjects of the following sec	-	
	implete the student?s general education in physics. The knowledge gained in this course will help to the students in study of s		
	suring technique and will allow them to understand the principles of novel technologies and functioning of new electronic device		ao robolico,
3B01KAT	Complex Analysis and Transformations	Z,ZK	7
3B38KDS	Communication and Distributed Systems	Z,ZK	6
	Communication and Distributed Systems on communication principles used within the distributed systems (DS). Initially the physical layer media are described, including	1 ' 1	_
-	modulation techniques. Information theory is introduced together with coding methods for error detection, correction and/or info	_	
	re explained (addressing, media access control, flow control, ARQ methods). Finally the most widely used distributed syste	· · · · · · · · · · · · · · · · · · ·	-
	y of TCP/IP protocols and typical distributed systems applications.	me teemelegiee a	o p. oooou
3B33KUI	Cybernetics and Artificial Intelligence	Z,ZK	6
ODOOLOI	Cybernetics and 7 timetal intelligence	_,,	
he course introduces	s the students into the field of artificial intelligence and gives the necessary basis for designing machine control algorithms. It a	dvances the know	ledge of state
	the students into the field of artificial intelligence and gives the necessary basis for designing machine control algorithms. It are by including uncertainty in state transition. Students are introduced into reinforcement learning for solving problems when t		_
pace search algorithr	ms by including uncertainty in state transition. Students are introduced into reinforcement learning for solving problems when t	the state transition	s are unknow
pace search algorithr hich also connects th	ms by including uncertainty in state transition. Students are introduced into reinforcement learning for solving problems when t ne artificial intelligence and cybernetics fields. Bayesian decision task introduces supervised learning. Learning from data is de	the state transition	s are unknow
pace search algorithr hich also connects the students practice the	ms by including uncertainty in state transition. Students are introduced into reinforcement learning for solving problems when t ne artificial intelligence and cybernetics fields. Bayesian decision task introduces supervised learning. Learning from data is de algoritms in computer labs.	the state transition emonstrated on a	s are unknowr linear classifie
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B3B38SME S	Sensors and Measurements	Z,ZK	6
B3B31SAS S	Signals and Systems	Z,ZK	5

The course focuses on explaining basic terms used for the description and analysis of determined signals and systems (including filters) in continuous- and discrete-time. The graduate will acquire a basic overview of the issues and learn how to work with concepts, perform simple analysis of systems and signals, and interpret and discuss the results.

Code of the group: 2015_BZAJ

Name of the group: Exam from the english language

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete 2 courses

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
B0B04B1K	English language B1 - classified assessment Petra Juna Jennings, Markéta Havlíčková, Pavla Péterová, Erik Peter Stadnik, Michael Ynsua Petra Juna Jennings Petra Juna Jennings (Gar.)	KZ	0	0C	Z,L	Р
B0B04B2Z	English language B2 - exam Petra Juna Jennings, Markéta Havlíčková, Michael Ynsua, Dana Saláková Petra Juna Jennings Petra Juna Jennings (Gar.)	Z,ZK	0	0C	Z,L	Р

Characteristics of the courses of this group of Study Plan: Code=2015 BZAJ Name=Exam from the english language

B0B04B1K	English language B1 - classified assessment	KZ	0
verifying of the studer	t´s skills of B1 level		
B0B04B2Z	English language B2 - exam	Z,ZK	0

I) The B2 English Exam is a compulsory subject for all Faculty of Electrical Engineering students at the Czech Technical University. According to the Study and Examination Rules and Regulations for Students at CTU (Part III, Article 4), a compulsory subject is one whose completion is a necessary condition in order to successfully complete the study programme. In addition, this requires the passing of an examination evaluated on the scale A, B, C, D, or E (SERR Part III, Article 6). II) According to the Common European Framework of Reference for Languages (CEFR), an international standard for describing language ability, the definition of an English language learner who has achieved the B2 (Upper-Intermediate) level is one who can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options. III) Students who have successfully passed an approved international exam within the past five years may present their certificate to the Department of Languages, Faculty of Electrical Engineering. Upon approval, students are then exempt from both the Written Test and the Oral Part. For a list of approved international exams go to the department website: http://jazyky.fel.cvut.cz/

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 20

The role of the block: PV

Code of the group: 2015_BKYRPV

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain at least 16 credits (at most 24)

Requirement courses in the group: In this group you have to complete at least 4 courses (at most 6)

Credits in the group: 16

Note on the group:

riote on the gro	•					
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
B3B14EPR	Electric Drives for Automation and Robotics	Z,ZK	4	2P+2L	L	PV
B3B35MSD	Modeling and Simulation of Dynamic Systems	Z,ZK	4	2P+2L	Z	PV
B3B38OTE	Circuit Technology Jan Holub Jan Holub (Gar.)	Z,ZK	4	2P+2L	L	PV
B3B35PAR	Programming of logic controllers and robots	Z,ZK	4	2P+2L	L	PV
B3B38VSY	Embedded Systems	Z,ZK	4	2P+2L	Z	PV
B3B33VIR	Robot Learning	Z,ZK	4	2P+2L	Z	PV

Characteristics of the courses of this group of Study Plan: Code=2015_BKYRPV Name=Compulsory subjects of the programme

B3B14EPR	Electric Drives for Automation and Robotics	Z,ZK	4				
The course gives a brief	The course gives a brief overview of basic types of electric drives. It deals with drives with DC, asynchronous, synchronous and special motors including power electronic converters. Anoth						
topics include control s	trategies such as scalar, vector, direct, sensorless control of AC drives, pulse width modulation strategies and various load type	es. It is focused o	on understanding				
the physical nature of a	given type of drive, general derivation of basic differential equations describing transient and steady states, and creating cor	responding mathe	ematical models				
of analyzed systems su	of analyzed systems suitable for both off-line simulation and online-adapted dynamic and real-time control using the basis of modern microprocessor technology. Problems of operating						
states, sensors and dia	gnostics of electric drives are also discussed. Basic knowledge of mathematics, mechanics, kinematics, dynamics, theory of e	electromagnetic fie	eld, circuit theory				
and control theory are	assumed.						

B3B35MSD	Modeling and Simulation of Dynamic Systems	Z,ZK	4		
B3B38OTE	Circuit Technology	Z,ZK	4		
Basic types of circuits and blocks of digital measuring instruments are described and analysed. Range and linearity for analogue circuits and interfaces for digital circuits are analysed in detail.					
B3B35PAR	Programming of logic controllers and robots	Z,ZK	4		
B3B38VSY	Embedded Systems	Z,ZK	4		
This subject is focused	on the embedded system design, especially using ARM Cortex-M based microcontrollers. The students need to solve two sir	nple and two com	plex projects of		
embedded system desi	gn using microcontroller. These projects include both circuit and program realization.				
B3B33VIR	Robot Learning	Z,ZK	4		
The course teaches application of machine learning methods and optimization on well-known robotic problems, such as semantic segmenation from RGB-D data or reactive motion control. The core of the course represents teaching of deep learning methods. Stidents will use basic knowledge from optimization and linear algebra such as robut solving of					

overdetermined systems of (non)linear (non)homogenous equations or gradient minimization methods. The labs are divided into two parts, in the first one, the students will solve basic

Code of the group: 2015_BKYRLAB

tasks in PyTorch, in the second one, individual semestral work.

Name of the group: Compulsory subjects of the programme

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:

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
B3B35LAR	Laboratory of applied electronics and control Martin Hlinovský Martin Hlinovský (Gar.)	KZ	4	0P+4L	L	PV
B3B38LPE	Laboratories of Industrial Electronics and Sensors	KZ	4	0P+4L	L	PV
B3B33LAR	Laboratory of robotics Vladimír Petrík, Pavel Krsek, Libor Wagner Pavel Krsek Pavel Krsek (Gar.)	KZ	4	0P+4L	L	PV

Characteristics of the courses of this group of Study Plan: Code=2015_BKYRLAB Name=Compulsory subjects of the programme

B3B35LAR	Laboratory of applied electronics and control	KZ.	4			
B3B38LPE	Laboratories of Industrial Electronics and Sensors	KZ	4			
The objective of the "Laboratories" is to introduce students in a playful and interactive way with basic blocks of an industrial sensor system - from the sensor itself, through signal						
processing circuits, analog to digital signal conversion, software processing by a microcontroller up to the sending of the results to the superior system or database and their presentation						

to the user within the concept "Internet of Things".

B3B33LAR Laboratory of robotics

ΚZ 4

During this laboratory courses the students are introduced with the practical robotics through solving of practical tasks. Students are working in laboratories in groups which consist of 3 or 4 members. During the semester, each group of students jointly solve one practical problem in the field of robotics. Tasks are designed to introduce students with robotics (manipulators and mobile robots). The students should utilize the basic knowledge obtained in previous study (eg. mathematics, physics, electronics, software development). Students can select specific task from few tasks with different specialization, which are announced each semester. Tasks differs between semesters. An integral part of the solution of the problem is cooperation and communication in the student team.

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

The role of the block: V

Code of the group: 2015_BKYRH

Name of the group: Humanities subjects

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

Credits in the group: 0 Note on the group:

Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Code Completion Credits Scope Semester Role members) Tutors, authors and guarantors (gar.) Ethic 1 B0B16ET1 ΚZ 2P+2C Vladimír Slámečka Vladimír Slámečka Vladimír Slámečka (Gar.) **Philosophy** B0B16FIL Z.L ZK 2 2P+0S Peter Zamarovský Peter Zamarovský (Gar.) Philosophy 1 B0B16FI1 ΚZ 4 2P+2S Ζ V Peter Zamarovský Peter Zamarovský (Gar.) History of technology and economic B0B16HTE ZK 2P+0S Z,LMarcela Efmertová, Jan Mikeš Marcela Efmertová Marcela Efmertová (Gar.)

B0B16HT1	History of science and technology 1 Marcela Efmertová, Jan Mikeš Marcela Efmertová Marcela Efmertová (Gar.)	KZ	4	2P+2S	Z	V
B0B16HI1	History 1 Milena Josefovičová Milena Josefovičová (Gar.)	KZ	4	2P+2S	Z	٧
B0B16MPS	Psychology Jan Fiala Jan Fiala Jan Fiala (Gar.)	Z,ZK	4	2P+2S	Z,L	V
B0B16MPL	Psychology for managers Jan Fiala Jan Fiala (Gar.)	ZK	2	2P+0S	Z,L	٧
A003TV	Physical Education	Z	2	0+2	L,Z	V

Characteristics of the courses of this group of Study Plan: Code=2015_BKYRH Name=Humanities subjects

B0B16ET1	Ethic 1	KZ	4
Aim of this subject is	to provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving variou	s situations of hun	nan life. Essentia
parts of the subject a	re discussions in which students can react to lectures but also to actual questions coming with news and look for the commun	al answers.	
B0B16FIL	Philosophy	ZK	2
We deal with the mo	st important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philo	sophy and conne	ction of old
philosophical though	ts with recent problems of science, technology, economics and politics.		
B0B16FI1	Philosophy 1	KZ	4
We deal with the mo	st important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philo	sophy and conne	ction of old
philosophical though	s with recent problems of science, technology, economics and politics.		
B0B16HTE	History of technology and economic	ZK	2
B0B16HT1	History of science and technology 1	KZ	4
B0B16HI1	History 1	KZ	4
B0B16MPS	Psychology	Z,ZK	4
B0B16MPL	Psychology for managers	ZK	2
	Physical Education	7	2

Code of the group: 2015_BJKA

Name of the group: English language courses

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

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
B0B04A21	English Language A2-1 Dana Saláková	Z		2s	Z	V
B0B04A22	English Language A2-2 Dana Saláková	Z	0	2s	L	V
B0B04B11	English Language B1-1 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	0	2C	Z	٧
B0B04B12	English Language B1-2 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	0	2C	L	V
B0B04B21	English Language B2-1 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	3	2C	Z	V
B0B04B22	English Language B2-2 Petra Juna Jennings Petra Juna Jennings (Gar.)	Z	3	2C	Z,L	V

Characteristics of the courses of this group of Study Plan: Code=2015_BJKA Name=English language courses

B0B04A21	English Language A2-1	Z	
The course is open	to students who are beginners in their second language. Course objective: Achieving competence in basic English.		'
B0B04A22	English Language A2-2	Z	0
The course is open	to students who are beginners in their second foreign language. The course objective is to develop and sustain their basic knowle	edge of the Engli	sh language.
B0B04B11	English Language B1-1	Z	0
Course objective: B	oadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary	expansion; unde	standing spoken
English.			
B0B04B12	English Language B1-2	7	0
DUDU4D12	English Language D1-2	_	0
	English Language 61-2 roadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary	∠ expansion; unde	rstanding spoken
		expansion; under	rstanding spoken
Course objective: B		expansion; under	rstanding spoken
Course objective: Br English. B0B04B21	roadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary	Z	3
Course objective: Br English. B0B04B21 This course is design	roadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary English Language B2-1	Z 32 - zkouška - B0	3 B04B2Z*). While
Course objective: Be English. BOB04B21 This course is design the course is focused.	roadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary English Language B2-1 Ined as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk E	Z 32 - zkouška - B0), it also focuses	3 B04B2Z*). While more on the

B0B04B22 English Language B2-2

Z 3

This course is designed as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2 - zkouška - B0B04B2Z*). While the course is focused on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark), it also focuses more on the academic and technical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropriate level of English for Erasmus / International Study.

Code of the group: BTV

Name of the group: Physical education

Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
TVV	Physical education	Z	0	0+2	Z,L	V
TV-V1	Physical education	Z	1	0+2	Z,L	V
TVV0	Physical education	Z	0	0+2	Z,L	V

Characteristics of the courses of this group of Study Plan: Code=BTV Name=Physical education

TVV	Physical education	Z	0
TV-V1	Physical education	Z	1
TVV0	Physical education	Z	0

Code of the group: BTVK

Name of the group: Physical education courses

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

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
TVKLV	Physical Education Course	Z	0	7dní	L	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V

Characteristics of the courses of this group of Study Plan: Code=BTVK Name=Physical education courses

TVKLV	Physical Education Course	Z	0
TVKZV	Physical Education Course	Z	0

Code of the group: 2015_BKYRVOL Name of the group: Elective subjects Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group: ~Nabídku volitelných předmětů uspořádaných podle kateder najdete na webových stránkách

http://www.fel.cvut.cz/cz/education/volitelne-predmety.html\\

List of courses of this pass:

Code	Name of the course	Completion	Credits
A003TV	Physical Education	Z	2
B0B01DRN	Differencial Equations and Numerical Analysis	Z,ZK	4

This course introduces students to the classical theory of ordinary differential equations (separable and linear ODEs) and also to bsics of numerical methods (errors in calculations and stability, numerical solutions of algebraic and differential equations and their systems). The course takes advantage of the synnergy between theoretical and practical point of view.

B0B01LAG	Linear Algebra	Z,ZK	8
	the initial parts of linear algebra. Firstly, the basic notions of a linear space and linear mappings are covered (linear dependence and independence)		
etc). The calculus	of matrices (determinants, inverse matrices, matrices of a linear map, eigenvalues and eigenvectors, diagonalisation, etc) is covered		ons include
B0B01LGR	solving systems of linear equations, the geometry of a 3D space (including the scalar product and the vector product) and S' Logic and Graphs	Z,ZK	5
	basics of mathematical logic and graph theory. Syntax and semantics of propositional and predicate logic are introduced. The importanc		
	and of the relationship between a formula and its model is stressed. Further, basic notions from graph theory are introduced		4
B0B01MA1	Mathematical Analysis 1	Z,ZK	7
'	The aim of the course is to introduce students to basics of differential and integral calculus of functions of one variable.		!
B0B01MA2	Mathematical Analysis 2	Z,ZK	7
The subject cover	rs an introduction to the differential and integral calculus in several variables and basic relations between curve and surface integrals.	Other part contain	ns function
DODO4 DOT	series and power series with application to Taylor and Fourier series.	7.71/	-
B0B01PST	Probability and Statistics	Z,ZK	7
B0B04A21	English Language A2-1 The course is open to students who are beginners in their second language. Course objective: Achieving competence in basic E	Z	
B0B04A22	English Language A2-2	Tigiisii.	0
	en to students who are beginners in their second foreign language. The course objective is to develop and sustain their basic knowler	_	l
B0B04B11	English Language B1-1	Z	0
	roadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary exp	ansion; understan	ding spoken
	English.		
B0B04B12	English Language B1-2	Z	0
Course objective: B	roadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary exp	ansion; understan	ding spoken
DODO 4D416	English.	1/7	
B0B04B1K	English language B1 - classified assessment verifying of the student's skills of B1 level	KZ	0
B0B04B21	English Language B2-1	Z	3
	pned as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2 -	_	_
	used on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark)		
	nical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropria		
	/ International Study.		
B0B04B22	English Language B2-2	Z	3
_	gned as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2 -		
	used on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark)		
academic and tech	nical vocabulary and grammar expected of students at the university level. *NOTE:This exam is also used for determining an appropria / International Study.	tte level of English	ioi Liasilius
B0B04B2Z	English language B2 - exam	Z,ZK	0
	exam is a compulsory subject for all Faculty of Electrical Engineering students at the Czech Technical University. According to the Students	,	-
Regulations for Stu	dents at CTU (Part III, Article 4), a compulsory subject is one whose completion is a necessary condition in order to successfully com	plete the study pro	ogramme. In
1	es the passing of an examination evaluated on the scale A, B, C, D, or E (SERR Part III, Article 6). II) According to the Common Euro		
1	EFR), an international standard for describing language ability, the definition of an English language learner who has achieved the B2		
	stand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisat Itaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed te		_
	vpoint on a topical issue giving the advantages and disadvantages of various options. III) Students who have successfully passed an		
	years may present their certificate to the Department of Languages, Faculty of Electrical Engineering. Upon approval, students are the		
	Test and the Oral Part. For a list of approved international exams go to the department website: http://jazyky.fel.cvut.cz/		
B0B16ET1	Ethic 1	KZ	4
1	is to provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving various situations in the students and orientation of the students are students.		fe. Essential
	f the subject are discussions in which students can react to lectures but also to actual questions coming with news and look for the co		
B0B16FI1	Philosophy 1 e most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philos	KZ	4
**C dear with the	philosophical thoughts with recent problems of science, technology, economics and politics.	opiny and connecti	on or old
B0B16FIL	Philosophy	ZK	2
	e most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philos		
	philosophical thoughts with recent problems of science, technology, economics and politics.		
B0B16HI1	History 1	KZ	4
B0B16HT1	History of science and technology 1	KZ	4
B0B16HTE	History of technology and economic	ZK	2
B0B16MPL	Psychology for managers	ZK	2
B0B16MPS	Psychology	Z,ZK	4
B0B33OPT	Optimization	Z,ZK	7
The course provide	s an introduction to mathematical optimization, specifically to optimization in real vector spaces of finite dimension. The theory is illustrated	ed with a number of	of examples.
Dono-:	You will refresh and extend many topics that you know from linear algebra and calculus courses.	 :	_
B0B35APO	Computer Architectures	Z,ZK	5
B0B35LSP	Logic systems and processors	Z,ZK	6
	ces computing resources' basic hardware structures, design, and architecture. It provides an overview of the possibilities of performing d		
	g embedded processor systems with peripherals on modern FPGA programmable logic circuits, which are increasingly widely used t DL, from logic to more complex sequential circuits to practical finite state machine (FSM) designs. They will also master the correct d	•	
· ·	DL, from logic to more complex sequential circuits to practical limite state machine (FSM) designs. They will also master the correct of Il problems are solved using development boards that hundreds of leading universities worldwide also use. The course ends with RISC		_
	and pipeline processing. [last updated January 2024]		.,,
B3B01KAT	Complex Analysis and Transformations	Z,ZK	7
	• • •		

B3B02FY1	Physics 1	Z,ZK	6
	physics at the Faculty of Electrical Engineering - Physics 1, is devoted to the introduction into two important areas of physics. The first		
	is the electric and magnetic field. Within the framework of the classical mechanics, the students study the particle kinematics; dynamic	· · · · · · · · · · · · · · · · · · ·	-
· · · · · · · · · · · · · · · · · · ·	nd rigid bodies. The students should be able to solve basic problems dealing with the description of mechanical systems, which they al mechanics is followed by the relativistic mechanics, electric and magnetic field - both stationary as well as non-stationary. The stuc	_	
	study of electrical circuits, theory of electrotechnical materials or radioelectronics. Apart of this, the knowledge gained in this course		J
	consecutive course Physics 2.	1	,
B3B02FY2	Physics 2	Z,ZK	6
The course Physic	s 2 is closely linked with the course Physics 1. Within the framework of this course the students will first of all learn foundations of the	rmodynamics. Fol	lowing topic
•	es - will give to the students basic insight into the properties of waves and will help to the students to understand that the presented of	•	
	er in spite of the waves character. Particular types of waves, such as acoustic or optical waves are the subjects of the following section		
	ill complete the student?s general education in physics. The knowledge gained in this course will help to the students in study of suc puter vision, measuring technique and will allow them to understand the principles of novel technologies and functioning of new elec		is rodotics,
B3B04PRE	Presentation Skills	KZ	2
B3B04PSA	Academic Writing	KZ	2
	d course in which students learn how or improve their ability to correctly and effectively formulate common written documents such a		1
. radiidany iddad	reports, protocols, articles, etc. Students will be acquainted with the main principles of writing professional texts.	5 ti 10ti 5 ti 11 ti 15ti 50	,
B3B14EPR	Electric Drives for Automation and Robotics	Z,ZK	4
	prief overview of basic types of electric drives. It deals with drives with DC, asynchronous, synchronous and special motors including powe		ters.Another
opics include contr	ol strategies such as scalar, vector, direct, sensorless control of AC drives, pulse width modulation strategies and various load types.	it is focused on ur	nderstanding
	of a given type of drive, general derivation of basic differential equations describing transient and steady states, and creating corresponding transient and steady states, and creating corresponding transient and steady states.	-	
, ,	s suitable for both off-line simulation and online-adapted dynamic and real-time control using the basis of modern microprocessor tech	0,	
tates, sensors and	diagnostics of electric drives are also discussed. Basic knowledge of mathematics, mechanics, kinematics, dynamics, theory of elect	romagnetic field, o	circuit theory
DODOLEDO	and control theory are assumed. Electronic Devices and Circuits	7 71/	-
B3B31EPO	ces students to the basic principles and methods of analysis of electrical circuits. Defines the circuit elements and gives their elemen	Z,ZK	6 t deals with
	ts of electronic systems based on analog as well as digital circuits. The course presents operational principles and methods of analysis		
	to the use of cybernetics and control systems.		
B3B31SAS	Signals and Systems	Z,ZK	5
	on explaining basic terms used for the description and analysis of determined signals and systems (including filters) in continuous- ar		he graduate
will acquire	a basic overview of the issues and learn how to work with concepts, perform simple analysis of systems and signals, and interpret a	nd discuss the res	sults.
B3B33ALP	Algorithms and Programming	Z,ZK	6
	give students a basic understanding of algorithms and programming and teach them to design, implement and test algorithms for sim	-	
	ion of computational complexity. They will learn about basic program building blocks such as loops, conditional statements, variables		
will introduce the	most often used data structures (queue, stack, list, array etc) and operations on them. We will show the basic algorithms, for exampl Students will learn to write simple programs in Python.	e for searching ar	na sorting.
B3B33KUI	Cybernetics and Artificial Intelligence	Z.ZK	6
	ices the students into the field of artificial intelligence and gives the necessary basis for designing machine control algorithms. It advants	,	-
	ithms by including uncertainty in state transition. Students are introduced into reinforcement learning for solving problems when the		-
which also connec	s the artificial intelligence and cybernetics fields. Bayesian decision task introduces supervised learning. Learning from data is demo	nstrated on a line	ar classifier.
	Students practice the algoritms in computer labs.		
B3B33LAR	Laboratory of robotics	KZ	4
=	ry courses the students are introduced with the practical robotics through solving of practical tasks. Students are working in laborator		
	s. During the semester, each group of students jointly solve one practical problem in the field of robotics. Tasks are designed to introd		
	nobile robots). The students should utilize the basic knowledge obtained in previous study (eg. mathematics, physics, electronics, sof ask from few tasks with different specialization, which are announced each semester. Tasks differs between semesters. An integral par	tware developme	ii). Siuderiis
an sciedt specifie i	ask normew tasks with americal specialization, which are almounded each semester. Tasks amers between semesters. All integral par	•	the problem
	is cooperation and communication in the student team.	•	the problem
B3B33ROB	is cooperation and communication in the student team. Robotics	t of the solution of	
B3B33ROB The course is an in	is cooperation and communication in the student team. Robotics roduction into industrial robotics with the emphasis on the industrial robots and manipulators. The robot kinematics is thoroughly stud	t of the solution of Z,ZK	5
	Robotics	t of the solution of Z,ZK	5
	Robotics roduction into industrial robotics with the emphasis on the industrial robots and manipulators. The robot kinematics is thoroughly study	t of the solution of Z,ZK	5
The course is an in B3B33VIR The course teacher	Robotics roduction into industrial robotics with the emphasis on the industrial robots and manipulators. The robot kinematics is thoroughly student to choose, design, and program industrial robot and integrate it into the robotic cell after passing the course. Robot Learning s application of machine learning methods and optimization on well-known robotic problems, such as semantic segmenation from Robotic problems.	Z,ZK died. The students Z,ZK GB-D data or reac	5 shall be able 4 ctive motion
B3B33VIR The course teacher control. The co	Robotics roduction into industrial robotics with the emphasis on the industrial robots and manipulators. The robot kinematics is thoroughly student to choose, design, and program industrial robot and integrate it into the robotic cell after passing the course. Robot Learning s application of machine learning methods and optimization on well-known robotic problems, such as semantic segmenation from Refer of the course represents teaching of deep learning methods. Stidents will use basic knowledge from optimization and linear algebra	Z,ZK died. The student s Z,ZK GB-D data or reaca	5 shall be able 4 ctive motion olving of
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B3B38KDS			
DODOGNOO	Communication and Distributed Systems	Z,ZK	6
The subject is focus	ed on communication principles used within the distributed systems (DS). Initially the physical layer media are described, including or	ommunication cha	nnel models
	tal modulation techniques. Information theory is introduced together with coding methods for error detection, correction and/or information the modulation to the control of the control o	•	•
link-layer algorithr	ns are explained (addressing, media access control, flow control, ARQ methods). Finally the most widely used distributed systems	s technologies are	presented
	together with the family of TCP/IP protocols and typical distributed systems applications.		
B3B38LPE	Laboratories of Industrial Electronics and Sensors	KZ	4
•	he "Laboratories" is to introduce students in a playful and interactive way with basic blocks of an industrial sensor system - from the		
processing circuits,	analog to digital signal conversion, software processing by a microcontroller up to the sending of the results to the superior system or d	atabase and their	presentation
	to the user within the concept "Internet of Things".		
B3B38OTE	Circuit Technology	Z,ZK	4
Basic types of circu	its and blocks of digital measuring instruments are described and analysed. Range and linearity for analogue circuits and interfaces	for digital circuits a	are analysed
	in detail.		
B3B38SME	Sensors and Measurements	Z,ZK	6
B3B38VSY	Embedded Systems	Z,ZK	4
This publicat is foor	sed on the embedded system design, especially using ARM Cortex-M based microcontrollers. The students need to solve two simple	e and two complet	v projects of
Triis subject is locu		c and two complex	k projects or
Triis subject is locu	embedded system design using microcontroller. These projects include both circuit and program realization.	c and two complex	k projects of
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