FACULTY OF ELECTRICAL
ENGINEERING
UNIVERSITY OF WEST BOHEMIA

FACULTY OF ELECTRICAL ENGINEEERING

INFORMATION ON DOCTORAL STUDY

Academic year 2021/2022

CONTENT

1 GENERAL INFORMATION ON FACULTY OF ELECTRICAL ENGINEERING 5
1.1 IDENTIFICATION DATA 5
1.2 STAFFING 5
1.2.1 FEE Scientific Board 6
1.2.2 FEE Disciplinary Committee 6
1.2.3 FEE Doctoral Study Board 7
1.2.4 FEE doctoral study programme guarantee 7
1.2.5 FEE study branches guarantees 7
1.2.6 List of supervisors at UWB FEE 8
1.2.7 Members of committees for State doctoral examinations and Dissertation defence 9
2 INTRODUCTORY INFORMATION ABOUT DOCTORAL STUDIES 13
3 STUDENT'S SOCIAL AFFAIRS 14
3.1 ACCOMMODATION 14
3.2 CATERING 14
3.3 SCHOLARSHIPS 14
3.3.1 Doctoral scholarship 14
3.3.2 Accomodation scholarships 15
3.3.3 Need-based scholarships 15
3.3.4 Extraordinary scholarships 16
4 ORGANIZATION AND MONITORING OF STUDY 17
4.1 REGISTRATION FOR THE FIRST AND FOLLOWING YEARS OF STUDY 17
4.2 STUDY ORGANIZATION 17
4.3 SUPERVISOR 17
4.4 CONSULTANT - SPECIALIST 17
4.5 THE DOCTORAL STUDY BOARD 18
4.6 INDIVIDUAL STUDY PLAN, REQUIREMENTS ON THE INDIVIDUAL STUDY PLAN 18
4.7 EXAMINATIONS 19
4.8 ASSESSMENT OF THE EXAMINATION (RESIT) 19
4.9 ELECTRICAL ENGINEERING AND INFORMATICS CONFERENCE 20
4.10 ANNUAL REPORT 20
4.11 CHANGE OF THE FORM OF THE STUDY, INTERRUPTION OF THE STUDY 20
4.12 INTERNSHIP TRAINING 21
4.13 DUAL SUPERVISION 21
4.14 GRADUATION 21
4.15 GRADUATION CEREMONY 22
4.16 DISCIPLINARY TRANSGRESSION 22
5 THE STATE DOCTORAL EXAMINATION 23
5.1 APPLICATION FOR THE STATE DOCTORAL EXAMINATION 23
5.2 DOCTORAL THESIS 23
5.3 EXAMINATION BOARD FOR THE STATE DOCTORAL EXAMINATION 24
5.4 EVALUATION OF APPLICATION FOR THE STATE DOCTORAL EXAMINATION 24
5.5 ASSESSMENT OF THE DOCTORAL THESIS 25
5.6 DATE OF THE STATE DOCTORAL EXAMINATION 25
5.7 PROCEDURE OF THE STATE DOCTORAL EXAMINATION 25
5.8 EVALUATION OF THE STATE DOCTORAL EXAMINATION 26
5.9 REPETITION OF THE STATE DOCTORAL EXAMINATION 26
6 DISSERTATION AND DISSERTATION DEFENCE 27
6.1 APPLICATION FOR A DISSERTATION DEFENCE 27
6.2 DISSERTATION 27
6.3 PUBLICATION OF THESES 28
6.4 OPPONENTS OF THE DISSERTATION 28
6.5 BOARD FOR DEFENCE OF THE DISSERTATION 28
6.6 EVALUATION OF APPLICATION FOR DISSERTATION DEFENCE 29
6.7 ASSESSMENT OF THE DISSERTATION BY THE OPPONENT 29
6.8 WITHDRAWAL FROM THE DISSERTATION DEFENCE 30
6.9 PROCEDURE OF DISSERTATION DEFENCE 30
6.10 EVALUATION OF DISSERTATION DEFENCE 30
6.11 PROCEDURE FOLLOWING AN UNSUCCESSFUL DEFENCE 31

ATTACHMENT 1_LIST OF SUBJECTS IN ENGLISH LANGUAGE 33

version 1. 9. 2021

This information is valid as of September 1, 2021. During the academic year, some regulations may change, or changes in personnel may occur.

1 GENERAL INFORMATION ON FACULTY OF ELECTRICAL ENGINEERING

1.1 Identification data

Address:	Fakulta elektrotechnická Západočeské univerzity v Plzni Univerzitní 26 301 00 Plzeň
Telephone:	377 634 001 – Dean's secretary (Mrs. Jitka Machová)
E-mail:	fel@fel.zcu.cz
www:	http://www.fel.zcu.cz
Billing address:	Západočeská univerzita v Plzni Fakulta elektrotechnická Univerzitní 8 301 00 Plzeň
Company ID:	49777513
VAT No:	CZ49777513
Data box ID:	zqfj9hj

1.2 Staffing

Dean:	**prof. Ing. Zdeněk PEROUTKA, Ph.D.** email: **pero@fel.zcu.cz**
Vice-Deans:	**doc. Ing. Jiří HAMMERBAUER, Ph.D.** Vice-Dean for Science Deputy Dean e-mail: **hammer@fel.zcu.cz** **doc. Ing. Roman PECHÁNEK, Ph.D.** Vice-Dean for Educational Activity **Ing. Jan MICHALÍK, Ph.D.** Vice-Dean for International Cooperation and Projects **doc. Ing. Jiří TUPA, Ph.D.** Vice-Dean for Strategy and Development
Faculty Secretary:	**Ing. Šárka NOVÁ** e-mail: **sarkan@fel.zcu.cz**
Office of the Dean:	**Jitka MACHOVÁ** e-mail: **machova@fel.zcu.cz** **Bc. Martina NOVÁKOVÁ** e-mail: **novakmar@fel.zcu.cz**
Study coordinator for doctoral study:	**Jana LEPIČOVÁ** e-mail: **lepic@fel.zcu.cz** Study coordinator for doctoral study Room EU202, phone: +420 377 634 015 Office hours: Monday, Wednesday, Friday 8:00 – 11:30, 12:30 – 15:00

1.2.1 FEE Scientific Board

prof. Ing. Zdeňka Benešová, CSc.	KEP, FEL ZČU v Plzni
prof. Ing. Pavel Brandštetter, CSc	VŠB-TU Ostrava
prof. Ing. Ivo Doležel, CSc.	KEP, FEL ZČU v Plzni
doc. Ing. Pavel Drábek, Ph.D.	KEV, FEL ZČU v Plzni
Ing. Dana Drábová, Ph.D.	SÚJB Praha
doc. Dr. Ing. Vjačeslav Georgiev	KEI, FEL ZČU v Plzni
doc. Ing. Aleš Hamáček, Ph.D.	KET, FEL ZČU v Plzni, Head of Department
doc. Ing. Jiří Hammerbauer, Ph.D.	KEI, FEL ZČU v Plzni, Vice-Dean for Science
prof. Ing. Stanislav Hanus, CSc.	VUT Brno
prof. Ing. Pavel Karban, Ph.D.	KEP, FEL ZČU v Plzni
prof. Ing. Václav Kůs, CSc.	KEV, FEL ZČU v Plzni, Head of Department
prof. Dr. Ing. Jiří Maryška, CSc.	TU Liberec
prof. Ing. Miloš Mazánek, CSc.	ČVUT Praha
prof. RNDr. Stanislav Nešpůrek, DrSc.	ÚMCH AV ČR
doc. Ing. Karel Noháč, Ph.D.	KEE, FEL ZČU v Plzni
doc. Ing. Roman Pechánek, Ph.D	KEV, FEL ZČU v Plzni
prof. Ing. Zdeněk Peroutka, Ph.D.	KEV, FEL ZČU v Plzni, dean
prof. Ing. Jiří Pinker, CSc.	KEI, FEL ZČU v Plzni
doc. Ing. Milan Polívka, Ph.D	FEL ČVUT Praha
prof. Ing. Josef Psutka, CSc.	KKY, FAV ZČU v Plzni
doc. Ing. Vlastimil Skočil, CSc.	KET, FEL ZČU v Plzni
Dr. Ing. Ladislav Sobotka	Škoda Electric a.s.
doc. Ing. Radek Škoda, Ph.D.	KEE/RICE, FEL ZČU v Plzni
doc. Ing. Václav Šmídl, Ph.D.	RICE, FEL ZČU v Plzni
doc. Ing. Petr Toman, Ph.D.	FEKT, VUT Brno
doc. Ing. Pavel Trnka, Ph.D.	KET, FEL ZČU v Plzni
prof. Ing. Viktor Valouch, CSc.	Ústav termomechaniky AV ČR
Ing. Stanislav Votruba	ČEPS, a.s. Praha
Ing. Jan Zdebor, CSc.	KKE, FST ZČU v Plzni
prof. Ing. Lumír Kule, CSc., emeritní profesor ZČU	Honorary member of FEE Scientific Board
prof. Ing. Daniel Mayer, DrSc.	Honorary member of FEE Scientific Board

1.2.2 FEE Disciplinary Committee

Chairman:	prof. Ing. Václav Kůs, CSc.
Members:	doc. Ing. Jiří Skála, Ph.D. (KEI)
	doc. Ing. Radek Polanský, Ph.D. (KET)
	Bc. Patrik Ferbas - student
	Ing. Jan Kaska - student
	Ondřej Růžička - student
Substitutes:	Ing. Jiří Fořt, Ph.D. (KEV)
	doc. Ing. Miloslava Tesařová, Ph.D. (KEE)
	Ing. Marcela Ledvinová, Ph.D. (KEP)
	Ing. Martin Juřík – student
	Bc. Jan Leffler – student
	Bc. Ondřej Rauner - student

1.2.3 FEE Doctoral Study Board

Chairman:	prof. Ing. Pavel Karban, Ph.D.	KEP, FEL ZČU v Plzni
Vice-Chairman:	prof. Ing. Václav Kůs, CSc.	KEV, FEL ZČU v Plzni
Members:	prof. Ing. Ivo Doležel, CSc.	KEP, FEL ZČU v Plzni
	doc. Ing. Pavel Drábek, Ph.D.	KEV, FEL ZČU v Plzni
	Ing. Pavel Dvořák, Ph.D.	Škoda Electric, a. s.
	doc. Dr. Ing. Vjačeslav Georgiev	KEI, FEL ZČU v Plzni
	doc. Ing. Aleš Hamáček, Ph.D.	KET, FEL ZČU v Plzni
	prof. Ing. Miroslav Husák, CSc.	FEL ČVUT Praha
	doc. Ing. Martin Kuchař, Ph.D.	FEI VŠB TU Ostrava
	doc. Ing. Karel Noháč, Ph.D.	KEE, FEL ZČU v Plzni
	doc. Ing. Milan Polívka, Ph.D.	FEL ČVUT Praha
	doc. Ing. Jiří Skála, Ph.D.	KEI, FEL ZČU v Plzni
	doc. Ing. Radek Škoda, Ph.D.	KEE/RICE FEL ZČU v Plzni
	doc. Ing. Václav Šmídl, Ph.D. et Ph.D.	RICE, FEL ZČU v Plzni / UTIA AV ČR, v.v.i.
	doc. Ing. Jiří Tupa, Ph.D.	KET, FEL ZČU v Plzni

1.2.4 FEE doctoral study programme guarantee

prof. Ing. Pavel Karban, Ph.D.	Electrical Engineering and Informatics
email: **karban@fel.zcu.cz**	

1.2.5 FEE study branches guarantees

prof. Ing. Ivo Doležel, CSc.	Electrical Power Engineering
prof. Ing. Pavel Karban, Ph.D.	Electrical Engineering
prof. Ing. Zdeněk Peroutka, Ph.D.	Electronics

1.2.6 List of supervisors at UWB FEE

Branch of study: Electronics

doc. Ing. Tomáš Blecha, Ph.D.	KET	prof. Ing. Jiří Pinker, CSc.	KEI
doc. Ing. Pavel Drábek, Ph.D.	KEV	doc. Ing. Martin Pittermann, Ph.D.	KEV
doc. Dr. Ing. Vjačeslav Georgiev	KEI	doc. Ing. Martin Poupa, Ph.D.	KEI
doc. Ing. Aleš Hamáček, Ph.D.	KET	doc. Ing. Jan Řeboun, Ph.D.	KET
doc. Ing. Jiří Hammerbauer, Ph.D.	KEI	doc. Ing. Bohumil Skala, Ph.D.	KEV
doc. Ing. Tomáš Glasberger, Ph.D.	KEV	doc. Ing. Jiří Skála, Ph.D.	KEI
prof. Ing. Pavel Karban, Ph.D.	KEP	Ing. Radek Soukup, Ph.D.	KET
doc. Ing. Ivan Konečný, CSc.	KEI	doc. Ing. František Steiner, Ph.D.	KET
Ing. Tomáš Komrska, Ph.D.	KEV	doc. Ing. Václav Šmídl, Ph.D.	KEV
Ing. Zdeněk Kubík, Ph.D.	KEI	prof. Ing. Milan Štork, CSc.	KEI
prof. Ing. Václav Kůs, CSc.	KEV	Ing. Jakub Talla, Ph.D.	KEV
Ing. Richard Linhart, Ph.D.	KEI	Ing. Oldřich Tureček, Ph.D.	KET
prof. Ing. Václav Mentlík, CSc.	KET	Ing. Ivo Veřtát, Ph.D.	KEI
prof. RNDr. Stanislav Nešpůrek, DrSc.	KET	prof. Ing. František Vondrášek, CSc.	KEV
prof. Ing. Zdeněk Peroutka, Ph.D.	KEV	doc. Ing. Karel Zeman, CSc.	KEV

Branch of study: Electrical Engineering

prof. Ing. Zdeňka Benešová, CSc.	KEP	Ing. Josef Pihera, Ph.D.	KET
prof. Ing. Ivo Doležel, CSc.	KEP	doc. Ing. Martin Pittermann, Ph.D.	KEV
doc. Ing. Aleš Hamáček, Ph.D.	KET	doc. Ing. Radek Polanský, Ph.D.	KET
doc. Ing. Karel Hruška, Ph.D.	KEV	doc. Ing. Jan Řeboun, Ph.D.	KET
prof. Ing. Pavel Karban, Ph.D.	KEP	doc. Ing. Bohumil Skala, Ph.D.	KEV
doc. Ing. Vladimír Kindl, Ph.D.	KEV	Ing. Radek Soukup, Ph.D.	KET
doc. Ing. Václav Kotlan, Ph.D.	KEP	doc. Ing. František Steiner, Ph.D.	KET
prof. Ing. Václav Kůs, CSc.	KEV	doc. Ing. Václav Šmídl, Ph.D.	KEV
doc. Ing. Jiří Laurenc, CSc.	KEE	doc. Ing. Pavel Trnka, Ph.D.	KET
Ing. František Mach, Ph.D.	KEP	doc. Ing. Jiří Tupa, Ph.D.	KET
prof. Ing. Václav Mentlík, CSc.	KET	doc. Ing. Olga Tůmová, CSc.	KET
prof. RNDr. Stanislav Nešpůrek, DrSc.	KET	prof. Ing. Zdeněk Vostracký, DrSc.	KEE
doc. Ing. David Pánek, Ph.D.	KEP		
doc. Ing. Roman Pechánek, Ph.D.	KEV		
prof. Ing. Zdeněk Peroutka, Ph.D.	KEV		

Branch of study: Electrical Power Engineering

prof. Ing. Zdeňka Benešová, CSc.	KEP	doc. Ing. Karel Noháč, Ph.D.	KEE
prof. Ing. Ivo Doležel, CSc.	KEP	doc. Ing. Lucie Noháčová, Ph.D.	KEE
doc. Ing. Emil Dvorský, CSc.	KEE	doc. Ing. David Pánek, Ph.D.	KEP
prof. Dr. Ing. Rainer Haller	KEE	Ing. Josef Pihera, Ph.D.	KET
doc. Ing. Pavla Hejtmánková, Ph.D.	KEE	prof. Ing. Zdeněk Peroutka, Ph.D.	KEV
prof. Ing. Pavel Karban, Ph.D.	KEP	doc. Ing. David Rot, Ph.D.	KEE
Ing. Tomáš Komrska, Ph.D.	KEV	Ing. Jan Sedláček, Ph.D.	KEE
doc. Ing. Václav Kotlan, Ph.D.	KEP	doc. Ing. Radek Škoda, MSc., Ph.D.	KEE
prof. Ing. Jiří Kožený, CSc.	KEE	prof. Ing. Jan Škorpil, CSc.	KEE
prof. Ing. Václav Kůs, CSc.	KEV	doc. Ing. Václav Šmídl, Ph.D.	KEV
doc. Ing. Jiří Laurenc, CSc.	KEE	doc. Ing. Miloslava Tesařová, Ph.D.	KEE
doc. Ing. Zbyněk Martínek, CSc.	KEE	prof. Ing. Zdeněk Vostracký, DrSc.	KEE
doc. Ing. Eva Müllerová, Ph.D.	KEE		

1.2.7 Members of committees for State doctoral examinations and Dissertation defence

(status 3. 8. 2021)

Branch of study: Electronics

Ing. Jan Balcar, Škoda Electric
prof. Ing. Josef Basl, CSc., ZČU FST
Ing. Karel Beneš, Ph.D., VÚŽ
Ing. František Bernat, CSc., ABB
Ing. Vojtěch Blahník, Ph.D., ZČU FEL
doc. Ing. Tomáš Blecha, Ph.D., ZČU FEL
prof. Ing. Pavel Brandštetter, CSc., VŠB TUO Ostrava
Ing. Martin Brandt, Ph.D., Stredoslovenská distribučná, a.s., Žilina
Ing. Jaromír Braun, DrSc., AV ČR
Ing. Marek Cédl, Ph.D., ZAT Plzeň
prof. Ing. Zdeněk Čeřovský, DrSc., ČVUT Praha, FEL
Ing. Vladislav Damec, Ph.D., VŠB TU Ostrava / Siemens
doc. Inf. Jiří Danzer, CSc., ZČU FEL
prof. Ing. Branislav Dobrucký, Ph.D., Žilinská univerzita, FEL
doc. Ing. Pavel Drábek, Ph.D., ZČU FEL
prof. Ing. Jaroslav Dudrik, CSc.,TU Košice, FEI
doc. Ing. Viliam Fedák, CSc.,TU Košice
prof. Ing. Pavol Fedor, CSc.,TU Košice, FEI
doc. Dr. Ing. Jiří Flajtingr, ZČU FEL
doc. Dr. Ing. Vjačeslav Georgiev, ZČU FEL
doc. Ing. Carlos Granja, Ph.D., ČVUT Praha ÚTEF
prof. Dr. Ing. Jürgen Haag, Hochschule Essingen, University of Applied Sciences
doc. Ing. Aleš Hamáček, Ph.D., ZČU FEL
doc. Ing. Jiří Hammerbauer, Ph.D., ZČU FEL
doc. Ing. Karel Hána, Ph.D., ČVUT Praha, FBMI
prof. Ing. Stanislav Hanus, CSc., VUT Brno, FEKT
Ing. Petr Hloušek, Ph.D., ZČU FEL
doc. Dr. Jiří Hospodka, ČVUT Praha, FEL
prof. Ing. Miroslav Husák, CSc., ČVUT Praha, FEL/ZČU FEL
prof. Ing. Petr Chlebiš, CSc., VŠB TU Ostrava
prof. Ing. Jaroslav Jerhot, DrSc., ZČU FEL
prof. Ing. Ondřej Jiříček, CSc., ČVUT Praha, FEL
prof. Ing. Pavel Karban, Ph.D., ZČU FEL
doc. Ing. Viera Khunová, Ph.D., STU Bratislava, FCHPT
prof. Ing. Miloš Klíma, CSc., ČVUT Praha, FEL
doc. Ing. Zdeňka Kolská, Ph.D., UJEP Ústí nad Labem, PřF
doc. Ing. Ivan Konečný, CSc., ZČU FEL
Ing. František Kostka, CSc., AV ČR
Ing. Václav Koucký, CSc., ZČU FEL
prof. Ing. Irena Kováčová, CSc., TU Košice, FEI
prof. Ing. Tomáš Kratochvíl, Ph.D., VUT Brno, FEKT
doc. Ing. Irena Kratochvílová, Ph.D., ČVUT Praha, FJFI
Ing. Petr Krist, Ph.D., Siemens, s.r.o, Plzeň
Ing. Martin Kuchař, Ph.D., VŠB TU Ostrava
doc. Ing. Vojtěch Kulda, CSc., ELCOM a.s
prof. Ing. Lumír Kule, CSc., ZČU FEL
prof. Ing. Václav Kůs, CSc., ZČU FEL
prof. Ing. Jiří Lettl, CSc., ČVUT Praha, FEL
Ing. Martin Lovecký, Ph.D., Škoda JS, a.s., Plzeň
doc. Ing. Pavel Mach, CSc., ČVUT Praha, FEL
prof. Ing. Václav Matoušek, CSc., ZČU FAV
prof. Ing. Daniel Mayer, DrSc., ZČU FEL
prof. Ing. Miloš Mazánek, CSc., ČVUT Praha, FEL
prof. Ing. Václav Mentlík, CSc., ZČU FEL
doc. Ing. Ivo Neborák, CSc., VŠB TU Ostrava
prof. RNDr. Stanislav Nešpůrek, DrSc., AV ČR / ZČU FEL
prof. Ing. Jaroslav Novák, CSc., UPCE
doc. Ing. Petr Palacký, Ph.D., VŠB TU Ostrava
doc. Ing. David Pánek, Ph.D., ZČU FEL
doc. Dr. Ing. Miroslav Patočka, VUT Brno, FEKT
prof. Ing. Zdeněk Peroutka, Ph.D., ZČU FEL
prof. Ing. Jiří Pinker, CSc., ZČU FEL
doc. Ing. Martin Pittermann, Ph.D., ZČU FEL
prof. Ing. Zdeněk Plíva, Ph.D., TU Liberec
prof. Dr. Ing. Miroslav Pokorný, VŠB TU Ostrava
Ing. Stanislav Pospíšil, DrSc., ČVUT Praha, UTEF
doc. Ing. Martin Poupa, Ph.D., ZČU FEL
prof. Ing. Aleš Richter, CSc., TUL Liberec, ÚMTI
prof. Dr. Ing. Efuard Rohan, DSc., ZČU FAV
prof. Georg Scharfenberg, OTH Regensburg
doc. Ing.Jakub Siegel, Ph.D., VŠCHT Praha
doc. Ing. Bohumil Skala, Ph.D., ZČU FEL
doc. Ing. Jiří Skála, Ph.D., ZČU FEL
doc. Ing. Vlastimil Skočil, CSc., ZČU FEL
Ing. Pavel Soukup, DrSc., ČVUT Praha, UTEF

prof. Ing. Pavel Sovka, CSc., ČVUT Praha, FEL
doc. Ing. František Steiner, Ph.D., ZČU FEL
prof. Ing. Vladimír Šály, Ph.D., STU Bratislava, FEI
doc. Ing. Jiří Šebesta, Ph.D., VUT Brno, FEKT
Ing. Milan Šíma, ZČU FEL
doc. Ing, Václav Šmídl, Ph.D., ZČU FEL
doc. Ing. Ivan Štekl, CSc., ČVUT Praha, ÚTEF
prof. Ing. Milan Štork, CSc., ZČU FEL
Ing. Jiří Švarný, Ph.D., ZČU FEL
prof. Ing. Václav Švorčík, DrSc., VŠCHT Praha, FCHT
Ing. Jakub Talla, Ph.D., ZČU FEL
doc. Ing. Olga Tůmová, CSc., ZČU FEL
doc. Ing. Jiří Tupa, Ph.D., ZČU FEL
Ing. Oldřich Tureček, Ph. D., ZČU FEL
doc. Ing. Jan Urbánek, CSc., ČVUT Praha, FEL
Ing. Jiří Vacátko, UniControls a.s., Praha
prof. Ing. Viktor Valouch, CSc., AV ČR / ČVUT FEL
doc. Ing. Vlastimil Vavřička, CSc., ZČU FAV
prof. Ing. Ján Vittek, Ph.D.,TU Žilina, FEI
prof. Ing. František Vondrášek, CSc., ZČU FEL
doc. Ing. Pavel Vorel, Ph.D., VUT Brno, FEKT
prof. Ing. Pavel Záskalický, Ph.D., TU Košice, FEI
Ing. Jan Zdebor, CSc., ZČU FST
doc. Ing. Karel Zeman, CSc., ZČU FEL
doc. Ing. Jaroslav Žáček, CSc., ČVUT Praha, FEL
doc. Ing. Václav Žalud, CSc., ČVUT Praha, FEL

Branch of study: Electrical Engineering

prof. Ing. Josef Basl, CSc., ZČU FST
prof. Ing. Zdeňka Benešová, CSc., ZČU FEL
Ing. František Bernat, CSc., ABB / VŠB TU Ostrava
doc. Ing. Tomáš Blecha, Ph.D., ZČU FEL
prof. Ing. Lubomír Brančík, CSc., VUT Brno, FEKT
prof. Ing. Pavel Brandštetter, CSc., VŠB TU Ostrava
Ing. Martin Brandt, Ph.D., Stredoslovenská distribučná, a.s., Žilina
Ing. Jaromír Braun, DrSc., ext.
Ing. Jiří Brázdil, MBA, Ph.D., ORGREZ a.s.
doc. Ing. Eva Černošková, CSc., UPCE Pardubice, FChT
prof. Ing. Jarmila Dědková, CSc., VUT Brno, FEKT
prof. Ing. Ivo Doležel, CSc., ZČU FEL
doc. Ing. Bc. Karel Dušek, Ph.D., ČVUT Praha, FEL
doc. Ing. Želmíra Ferková, CSc., TU Košice, FEI
prof. Ing. Vítězslav Hájek, CSc., VUT Brno, FEKT
prof. Dr. Ing. Rainer Haller, ZČU FEL
doc. Ing. Aleš Hamáček, Ph.D., ZČU FEL
prof. Ing. Jan Holub, Ph.D., ČVUT Praha, FEL
doc. Ing. Gejza Horváth, CSc., UJEP Ústí nad Labem, FVTM
prof. Ing. Valéria Hrabovcová, Ph.D., Žilinská univerzita, FEL
doc. Ing. Karel Hruška, Ph.D., ZČU FEL
prof. Ing. Miroslav Husák, CSc., ČVUT Praha, FEL / ZČU FEL
prof. Ing. Petr Chlebiš, CSc., VŠB TU Ostrava
doc. Ing. Miroslav Chomát, CSc., AV ČR
doc. Ing. Lubomír Ivánek, CSc., VŠB TU Ostrava, FEI
prof. Ing. Jaroslav Jerhot, DrSc., ZČU FEL
prof. Ing. Pavel Karban, Ph.D., ZČU FEL
prof. Ing. Jiří Kazelle, CSc., VUT Brno, FEKT
doc. Ing. Viera Khunová, Ph.D., STU Bratislava, FCHPT
doc. Ing. Vladimír Kindl, Ph.D., ZČU FEL
doc. Ing. Zdeňka Kolská, Ph.D., UJEP Ústí nad Labem
Ing. František Kostka, CSc., AV ČR
doc. Ing. Václav Kotlan, Ph.D., ZČU FEL
Ing. Lukáš Koudela, Ph.D., Daikin Industries Czech Republik, s.r.o.
prof. Ing. Dobroslav Kováč, CSc., TU Košice
prof. Ing. Jiří Kožený, CSc., ZČU FEL
doc. Ing. Eva Kučerová, CSc., ZČU FEL
doc. Ing. Vojtěch Kulda, CSc., ELCOM
RNDr. Pavel Kůs, Ph.D., MÚ AV ČR
prof. Ing. Václav Kůs, CSc., ZČU FEL
doc. Dr. Ing. Jan Kyncl, ČVUT Praha, FEL
doc. Ing. Jiří Laurenc, CSc., ZČU FEL
prof. Ing. Jiří Lettl, CSc., ČVUT Praha, FEL
doc. Ing. Dalibor Lukáš, Ph.D., VŠB TU Ostrava, FEI
Ing. František Mach, Ph.D., ZČU FEL
doc. Ing. Pavel Mach, CSc., ČVUT Praha, FEL
prof. Ing. Daniel Mayer, DrSc., ZČU FEL
prof. Ing. Václav Mentlík, CSc., ZČU FEL
Ing. Martin Michajlec, Ph.D., Continental Brandýs nad Labem
doc. Ing. Eva Müllerová, Ph.D., ZČU FEL
prof. RNDr. Stanislav Nešpůrek, DrSc., AV ČR / ZČU FEL

doc. Ing. David Pánek, Ph.D., ZČU FEL
doc. Dr. Ing. Miroslav Patočka, VUT Brno, FEKT
doc. Ing. Roman Pechánek, Ph.D., ZČU FEL
prof. Ing. Zdeněk Peroutka, Ph.D., ZČU FEL
Ing. Josef Pihera, Ph.D., ZČU FEL
doc. Ing. Martin Pittermann, Ph.D., ZČU FEL
doc. Ing. Radek Polanský, Ph.D., ZČU FEL
doc. Ing. Radek Procházka, Ph.D., ČVUT Praha, FEL
Ing. Pavel Prosr, Ph.D., ZČU FEL
Ing. Petr Rada, CSc., e t.
prof. Ing. Pavol Rafajdus, Ph.D., Žilinská univerzita, FEL
prof. Ing. Aleš Richter, CSc., TUL Liberec, FM
Ing. Pavel Ritz, Ph.D., Monarfle , s. r. o., Štúrovo
doc. Ing. Jan Řeboun, Ph.D., ZČU FEL
doc. Ing. Jakub Siegel, Ph.D., VŠCHT Praha
doc. Ing. Bohumil Skala, Ph.D., ZČU FEL
doc. Ing. Vlastimil Skočil, CSc., ZČU FEL
doc. Ing. Milan Smetana, Ph.D., Žilinská univerzita, FEIT
Ing. Pavel Soukup, Ph.D., ČVUT Praha, UTEF
prof. Ing. Oldřich Starý, CSc., ČVUT Praha, FEL
doc. Ing. František Steiner, Ph.D., ZČU FEL
doc. Ing. Ondřej Straka, Ph.D., ZČU FAV
prof. Ing. Vladimír Šály, Ph.D., STU Bratislava, FEI
Ing. Lumír Šašek, CSc., ETD Plzeň
Ing. Milan Šíma, ZČU FEL
doc. Ing. Michal Šimon, Ph.D., ZČU FST
doc. Ing. Václav Šmídl, Ph.D., ZČU FEL
Ing. Jan Švec, Ph.D., ČVUT Praha, FEL
prof. Ing. Václav Švorčík, DrSc., VŠCHT Praha
doc. Ing. Pavel Trnka, Ph.D., ZČU FEL
prof. Ing. David Tuček, Ph.D., UTB Zlín, FAME
doc. Ing. Olga Tůmová, CSc., ZČU FEL
doc. Ing. Jiří Tupa, Ph.D., ZČU FEL
doc. Ing. Jan Urbánek, CSc., ČVUT Praha, FEL
prof. Ing. Viktor Valouch, CSc., AV ČR
doc. Ing. Michal Váry, PhD., STU Bratislava, FEI
doc. Ing. František Veselka, CSc., VUT Brno, FEKT
doc. Ing. Ondřej Vítek, Ph.D., VUT Brno, FEKT
prof. Ing. František Vondrášek, CSc., ZČU FEL
doc. Ing. Pavel Vorel, Ph.D., VUT Brno, FEKT
prof. Ing. Zdeněk Vostracký, DrSc., ZČU FEL
prof. Ing. Pavel Záskalický, Ph.D., TU Košice, FEI
Ing. František Zeman, Ph.D., BRUSH SEM, s.r.o.
doc. Ing. Karel Zeman, CSc., ZČU FEL
Ing. Jiří Zemánek, Ph.D., ČVUT Praha, FEL
doc. Ing. Jaroslav Žáček, CSc., ČVUT Praha, FEL

Branch of study: Electrical Power Engineering

prof. Ing. Juraj Altus, Ph.D., Žilinská univerzita, FEL
Ing. Jiří Barták, CSc., ČEPS
doc. Ing. Lumír Beňa, Ph.D., TU Košice, FEI
prof. Ing. Zdeňka Benešová, CSc., ZČU FEL
Ing. František Bernat, CSc., ABB
doc. Ing. Peter Braciník, Ph.D., Žilinská univerzita, FEL
Ing. Jiří Brázdil, MBA, Ph.D., ORGREZ a.s.
prof. Ing. Ivo Doležel, CSc., ZČU FEL
prof. Ing. Jiří Drápela, Ph.D., VUT, FEKT
doc. Ing. Emil Dvorský, CSc., ZČU FEL
prof. Ing. Radomír Goňo, Ph.D., VŠB-TU Ostrava
doc. Dr. Ing. Jiří Gurecký, VŠB TU Ostrava
prof. Dr.-Ing. Rainer Haller, ZČU FEL
doc. Ing. Pavla Hejtmánková, Ph.D., ZČU FEL
Ing. Jan Hrůza, Škoda ETD Transformátory
doc. Ing. Miroslav Chomát, CSc., AV ČR
doc. Ing. Eduard Janeček, CSc., ZČU FAV
prof. Ing. František Janíček, Ph.D., TU Bratislava
Ing. Martin Kadera, Ph.D., ČEZ, a.s.
prof. Ing. Pavel Karban, Ph.D., ZČU FEL
Ing. Martin Kašpírek, Ph.D., E.ON ČR, s.r.o.
doc. Ing. Viera Khunová, Ph.D., STU Bratislava, FCHPT
prof. Ing. Michal Kolcun, Ph.D., TU Košice, FEI
prof. Ing. Iraida Kolcunová, Ph.D., TU Košice, FEI
doc. Ing. Václav Kotlan, Ph.D., ZČU FEL
Ing. Lukáš Koudela, Ph.D., Daikin Industries Czech Republik, s.r.o.
prof. Ing. Jiří Kožený, CSc., ZČU FEL
doc. Ing. Irena Kratochvílová, Ph.D., ČVUT, Praha, FJFI
doc. Ing. Petr Krejčí, Ph.D., VŠB-TU Ostrava
prof. Ing. Václav Kůs, CSc., ZČU FEL
doc. Dr. Ing. Jan Kyncl, ČVUT Praha, FEL
Ing. František Kysnar, Ph.D., EGC – EnerGoConsult ČB s.r.o., České Budějovice
doc. Ing. Jiří Laurenc, CSc., ZČU FEL
Ing. Martin Lovecký, Ph.D., Škoda JS, a. s., Plzeň
Ing. František Mach, Ph.D., ZČU FEL
doc. Dr. Ing. Veleslav Mach, VŠB TU Ostrava
doc. Ing. Zbyněk Martínek, CSc., ZČU FEL
doc. Ing. Karel Máslo, CSc., ČEPS a.s. Praha / VUT Brno

doc. Ing. Petr Mastný, Ph.D, VUT Brno, FEKT
prof. Ing. Daniel Mayer, DrSc., ZČU FEL
Ing. David Mezera, Ph.D., E.ON ČR, s.r.o.
doc. Ing. Pavel Mindl, CSc., ČVUT Praha, FEL
doc. Ing. Zdeněk Müller, Ph.D., ČVUT Praha, FEL
doc. Ing. Eva Müllerová, Ph.D., ZČU FEL
doc. Ing. Karel Noháč, Ph.D., ZČU FEL
doc. Ing. Lucie Noháčová, Ph.D., ZČU FEL
Ing. Pavel Novák, Ph.D., ZČU FEL / Schneider Electric Sachsenwerk GmbH, Regesburg, SRN
doc. Ing. Alena Otčenášová, Ph.D., Žilinská univerzita, FEL
Ing. David Pánek, Ph.D., ZČU FEL
Ing. Václav Pašek, Ph.D., Plzeňská teplárenská, a.s.
prof. Ing. Zdeněk Peroutka, Ph.D., ZČU FEL
Ing. Josef Pihera, Ph.D., ZČU FEL
Ing. Antonín Podhrázký, Ph.D., Rillfem Plzeň
doc. Ing. Igor Poznyak, CSc., ZČU FEL
doc. Ing. Radek Procházka, Ph.D., ČVUT Praha, FEL
prof. Ing. Aleš Richter, CSc., TU Liberec, ÚMTI
doc. Ing. David Rot, Ph.D., ZČU FEL
prof. Ing. Stanislav Rusek, CSc., VŠB TU Ostrava
Ing. Jan Sedláček, Ph.D., ZČU FEL
prof. Ing. Oldřich Starý, CSc., ČVUT Praha, FEL
prof. Ing. Vladimír Šály, Ph.D., STU Bratislava, FEI
doc. Ing. at Ing. Radek Škoda, MSc., Ph.D., ZČU FEL
Ing. Martin Škopek, Ph.D., Energy Consulting
prof. Ing. Jan Škorpil, CSc., ZČU FEL
doc. Ing. Václav Šmídl, Ph.D., ZČU FEL
Ing. Jan Švec, Ph.D., ČVUT Praha, FEL
doc. Ing. Miloslava Tesařová, Ph.D., ZČU FEL
prof. Ing. Josef Tlustý, CSc., ČVUT Praha, FEL
doc. Ing. Petr Toman, Ph.D., VUT Brno, FEKT
doc. Ing. Pavel Trnka, Ph.D., ZČU FEL
prof. Ing. Viktor Valouch, CSc., AV ČR
doc. Ing. Michal Váry, Ph.D., STU Bratislava, FEI
prof. Ing. Zdeněk Vostracký, DrSc., ZČU FEL
Ing. Stanislav Votruba, ČEPS
Ing. František Vybíralík, CSc., ČEZ, a. s.
Ing. Jan Zdebor, CSc., ZČU FST
Ing. František Zeman, Ph.D., BRUSH SEM, s.r.o.
Ing. František Žák, Ph.D., Energetický regulační úřad
Ing. Petr Žák, Ph.D., Ateliér světelné techniky, s.r.o.

2 INTRODUCTORY INFORMATION ABOUT DOCTORAL STUDIES

Graduates of the corresponding master's degree programme have the opportunity to extend their knowledge in the doctoral study programme. This study represents the third, and highest qualification under the classification of higher education.

The doctoral study programme focuses on scientific research and independent creative activity in research or development. Graduates of doctoral study programmes are awarded the academic qualification "Doctor" (abbreviated to "**Ph.D.**" placed after the name).

The doctoral study programme can be either **full-time or part-time**. Study in the doctoral study programme follows the student´s individual study plan with the guidance of a supervisor. The standard length of study is **four (4)** years. Study in the doctoral study programme is monitored and evaluated by the Doctoral Study Board.

The Doctoral study programme consists of two parts that can overlap in time, namely
- the formal study part culminating in the completion of the State doctoral examination, and
- the scientific and professional part focused on elaboration of the Dissertation and its defence.

The programme is completed by the State doctoral examination and a public defence of the Dissertation. The Dissertation defence proves the ability and readiness of the student for independent research activity or development or for independent theoretical and creative activity. The Dissertation must include original and also published results or results accepted for publication.

At UWB FEE, it is possible to achieve a Ph.D in the study programme „"Electrical Engineering and Informatics" in branch of study:

- **Electrical Engineering**
- **Electronics**
- **Electrical Power Engineering**

At UWB FEE, all doctoral branches of study can be in either Czech or English.

(texts used from Act No. 111/98 Coll., on Higher Education, as amended on 1 January 2018, Article 47)

Educational goals of the study branch Electrical Power Engineering

The graduates show deep knowledge of generating, transmission and use of electric energy as well as of the issues of environment and electromagnetic compatibility. The graduates show deep knowledge of computer and information technology. They are capable of individual creative work on solving complex technical problems and interpretation of the results of their work. The graduates are proficient in spoken as well as written English. They prove their adaptability in scientific work and the capability of generalization.

Educational goals of the study branch Electronics

The graduates show deep knowledge of light-current electronics and telecommunications, power electronics, and electric drives controlled by modern means of light-current electronics. The graduates show deep knowledge of computer and information technology. They are capable of individual creative work on solving complex technical problems and interpretation of the results of their work. The graduates are proficient in spoken as well as written English. They prove their adaptability in scientific work and the capability of generalization.

Educational goals of the study branch Electrical Engineering

The graduates show deep knowledge of heavy-current electronics, constructional and project processes, testing, material engineering and diagnostics. The graduates show deep knowledge of computer and information technology. They are capable of individual creative work on solving complex technical problems and interpretation of the results of their work. The graduates are proficient in spoken as well as written English. They prove their adaptability in scientific work and the capability of generalization.

3 STUDENT'S SOCIAL AFFAIRS

3.1 Accommodation

Accommodation services for students are provided by UWB **Accommodation and Catering Services of UWB (SKM)**- http://skm.zcu.cz (in Czech language). Information on accommodation for doctoral students - Mrs. Jitka Hurtová, SKM secretary, +420 377 634 851, email: hurtovaj@skm.zcu.cz.

(https://skm.zcu.cz/cs/)

3.2 Catering

Every FEE student has the possibility to use the UWB catering services. Payment for meals is via a JIS card which each student is provided with. At present it is possible to have meals at two university canteens:

- University canteen 4, Univerzitní 12, Pilsen (on the campus)
- University canteen 1, Kollárova 19, Pilsen (in the city centre)

At UWB, catering services are provided by the **Accommodation and Catering Services of UWB (SKM)** - http://skm.zcu.cz (in Czech language). In addition, there are several cafés and bars on the campus.

3.3 Scholarships

All awarded scholarships shall be disbursed by a bank transfer made to an account owned by the student. For this purpose, students are obliged to input their bank account number in the electronic information system STAG.

In the case of a change of decisive factors concerning the award of a scholarship, the student shall send a written notification to the Study Office of the Faculty, or the Section of the Vice-Rector for Teaching and Learning, no later than 30 days after the occurrence thereof.

One-time paid scholarships shall be disbursed at the latest on the 15th day of the month following the month in which the decision on awarding a scholarship has come into force.

Monthly-paid scholarships shall be disbursed at the latest on the 15th day of the relevant month.

First-year students who meet the conditions for the award of an accommodation scholarship shall receive the proportional amount for the 3rd quarter of the calendar year no sooner than on the day the payment for the 4th quarter of the relevant calendar year is made.

(Scholarship regulations of the University of West Bohemai dated 11 April 2017 – čl.2, 8 – incomplete text)

3.3.1 Doctoral scholarship

Full-time doctoral students may be granted a scholarship awarded by the Dean of the Faculty. The amount thereof is determined based on a proposal made by the supervisor and the members of the Doctoral Study Board. Doctoral scholarships are awarded for a period of twelve months of the relevant academic year.

Depending on the study results achieved and on the fulfilment of individual study plan requirements, the Doctoral Study Board may, upon the supervisor's proposal, suggest that the Dean of the Faculty revokes the scholarship, or makes changes of the amount awarded.

The entitlement to be awarded a doctoral scholarship ceases to exist on the last day of the month in which a student interrupted the study programme, or changed the form of study.

(Scholarship regulations of the University of West Bohemai dated 11 April 2017 – Art. 5)

Students of doctoral study programmes in a full-time form of study receive a basic scholarship of 7,500 CZK per month for the standard length of study. After each examination passed (except for a foreign

language examination), the basic amount is increased by 500 CZK, up to a maximum of 10,000 CZK. Upon successful completion of the State Doctoral Examination (SDE), the student receives a scholarship of 15,000 CZK per month.

If a doctoral student:

- fails to meet the deadlines of the Individual Study Plan,
- fails to successfully complete the State Doctoral Examination within 24 months of the commencement of his/her studies, or
- fails to successfully pass the State Doctoral Examination even on the date of a resit specified by the Dean,

the amount of his/her scholarships is reduced by 1,000 CZK for each non-fulfilled obligation.

(Dean's Decree No. 15D/2020 - Scholarships granted to students of Faculty of Electrical Engineering of University of West Bohemia in 2020/21 - Art. 3 – incomplete text)

3.3.2 Accomodation scholarships

An accommodation scholarship may be awarded to a student who:

- is a full-time student of an accredited bachelor's, master's or doctoral study programme provided at this university,
- is enrolled in his/her first accredited study programme, or is enrolled in a related accredited follow-up study programme (this condition is not met if the student is enrolled inother than an accredited follow-up study programme), or has transferred from one study programme to another and his/her previous studies have been recognized. In the case of concurrently attended study programmes, the student is considered to be enrolled only once, and that in the study programme in which he/shewas enrolled first,
- has not exceeded the standard study period of the relevant study programme, or of the concurrently attended study programme,
- does not have permanent residence in the region in which he/she attends the study programme.

The fulfilment of conditions set out above shall be verified via the student register and IS/STAG.

The application for an accommodation scholarship shall be submitted electronically using a form issued for the purpose thereof.

The decision on awarding the accommodation scholarship shall be made by the Rector

The decision on awarding the accommodation scholarship shall be in force for the period the student meets the conditions set out above. No official decision stipulating the revocation of an accommodation scholarship is required.

The amount of the accommodation scholarship to be awarded for the relevant calendar trimester is stipulated by the Decision issued by the Rector no later than 10 days before the date of its payment.

A student who meets the conditions set out above only in part of the period for which the scholarship shall be paid, receives the proportional amount thereof.

(Scholarship regulations of the University of West Bohemai dated 11 April 2017 – Art. 6 – incomplete text)

The amount and date of the accommodation scholarship to be awarded for the relevant calendar trimester is stipulated by the Decision issued by the Rector.

Link for Application:
https://portal.zcu.cz/portal/ja/mujportal/index.html?pc_lang=en

3.3.3 Need-based scholarships

Pursuant to Art. 91(3) of the Act, need-based scholarships shall be awarded to students who qualify for increased child support according to a special regulation1 provided that the relevant family income ascertained for the purpose of child support does not exceed the family subsistence level multiplied by a factor of 1.5. The student shall prove his/her entitlement to be awarded the scholarship by a written confirmation issued on his/her request by a relevant state social support authority. The notification for the purpose of awarding the scholarship is valid for 21 months from the end of the quarter of the year

for which the family income was ascertained. The student is entitled to be awarded the scholarship only once during a specific period of time, and shall submit a new confirmation at the latest one month after the expiration thereof; otherwise, his/her entitlement to the scholarship ceases to exist.

The application for a need-based scholarship shall be submitted electronically using a form issued for the purpose thereto.

A student is entitled to be awarded a need-based scholarship for each full calendar month during which he/she meets the conditions set out above. However, this entitlement does not apply during the months of July and August.

The decision on awarding a need-based scholarship shall be issued by the Rector. The Rector is not obliged to issue a decision on the revocation thereof.

The amount of a need-based scholarship to be awarded is stipulated by the appropriated Czech legal regulations. Act. In the case of changes concerning the amount of the need-based scholarship to be awarded, the Rector shall issue a new decision.

(Scholarship regulations of the University of West Bohemai dated 11 April 2017 – Art. 7 – incomplete text)

The scholarship is equivalent to one quarter of the minimum wage per month, which from 1 January 2020 is 3 650 CZK per month.

(https://www.zcu.cz/pracoviste/ipc/studijni-poradenstvi/socialni-stipendium/)

Link for Application:
https://portal.zcu.cz/portal/ja/mujportal/index.html?pc_lang=en

3.3.4 Extraordinary scholarships

The Dean of a Faculty, or the Rector, is entitled to award an extraordinary scholarship to students of bachelor's, master's, or doctoral study programmes.

An extraordinary scholarship shall be awarded on the basis of a duly reasoned application submitted by the student, a proposal of the relevant Department, or the Rector's or Dean's initiative.

(Scholarship regulations of the University of West Bohemai dated 11 April 2017 – Art. 4)

A student of a doctoral study programme in a full-time form can receive an extraordinary scholarship in support of his / her publishing activities. Extraordinary scholarships for FEE students are paid during the calendar year. A scholarship proposal may be submitted by the supervisor, the head of the department, the chairman of the doctoral study board or a member of the FEE management. For an extraordinary social scholarship, a doctoral student may also submit a proposal.

An extraordinary scholarship can be composed of two parts:

- a part depending of the quality of fulfilling the curriculum, other professional and extraordinary activities of a doctoral student within the department, faculty, UWB;
- a part determined on the basis of results of R&D activities of a doctoral student.

((Dean's Decree No. 15D/2020 - Scholarships granted to students of Faculty of Electrical Engineering of University of West Bohemia in 2019/20 - Art. 3 – incomplete text)

4 ORGANIZATION AND MONITORING OF STUDY

The Vice-Dean for Research decides on matters pertaining to doctoral study, including scholarships.

4.1 Registration for the first and following years of study

Dates of registration for the first year of study are set out in the decision on admission; registration is organized by the Study Office. Registration for the following years of study is carried out according to the Dean's decision regarding continuation of study following the student's annual evaluation.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 1 - incomplete text)

Students returning after an interruption of studies complete their registration in the course of the academic year; however, no later than within five days following the termination of the interruption of studies.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. V, Art. 78, incomplete text)

4.2 Study organization

A full-time doctoral study programme student is present at the training unit where he/she participates in both teaching and research activities, to the extent determined by the head of the unit.

The extent of the student´s teaching and research activities is determined by the head of the unit in cooperation with the supervisor. The recommended number of lessons for full-time students is at least two lessons per week during a semester in the case of students in the first year, and at least four lessons per week during a semester for students in the following years.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 1 - incomplete text)

4.3 Supervisor

The supervisor provides both specialist and organizational guidance for the student's studies. Based on the supervisor's approval, the student establishes his/her daily regime and holidays.

The supervisor guides the student in his/her work on the Dissertation and monitors his/her study obligations and their fulfillment.

The supervisor is entitled to participate in the student's examinations during his/her studies.

The Dean can, on the recommendation of the Doctoral Study Board, change the supervisor.

A supervisor must be a professor or an associate professor. Other specialists can only be supervisors if authorized by the Faculty Scientific Board.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. III, Art. 72 a 73 – incomplete text)

The list of supervisors is given in Chapter 1.3.9.

4.4 Consultant - specialist

For consultations on specific issues concerning the topic of the student's Dissertation, the Dean can, upon the supervisor's recommendation, appoint a leading specialist in the given field as a consulting specialist.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. III, Art. 74)

4.5 The Doctoral Study Board

The Doctoral Study Board controls and evaluates studies in the relevant doctoral study programme / branch of study. In particular, the Doctoral Study Board

- suggests changes to study programmes / branches of study,
- monitors and discusses students' scientific work,
- proposes supervisors and, through the Dean, submits their names together with their professional CVs to the Faculty Scientific Board for approval,
- discusses proposals for topics of doctoral theses and their supervisors and, through the Dean, submits them to the Faculty Scientific Board for approval,
- discusses and proposes to the Dean students' individual study plans and their modifications where necessary,
- defines the breadth and depth of the requirements for the State doctoral examination
- proposes to the Dean the members of the State doctoral examination committee and the date for holding the examination,
- proposes to the Dean members of the Dissertation defence committee and the date for holding the defence,
- proposes to the Dean members of the admissions committee, whose role is to decide on a candidate's admission to study in a doctoral study programme / branch of study.

The Doctoral Study Board has a minimum of five members. The Doctoral Study Board chair is the guarantor of the doctoral study programme.

The Doctoral Study Board meets at least once a year, by the end of September at the latest.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. II, Art. 68 – 71 – incomplete text)

4.6 Individual study plan, requirements on the individual study plan

Studies are based on an individual study plan. The study plan is proposed by the supervisor upon previous discussion with the student.

The individual study plan will be discussed by the Doctoral Study Board and then approved by the Dean, usually by the end of October of the year in which a student has been registered for study. A similar procedure is applied to the approval of any changes to the individual study plan in the following years.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IV, Art. 75 - 77, 85 - incomplete text)

Students of the doctoral study programme must choose five courses of a theoretical and specialist character, of which a maximum of three courses can be specialist courses.

English language is the obligatory language in the doctoral study programme. Language skills are usually demonstrated through an English language examination at FEE or the UWB Institute of Applied Language Studies. Other possibilities of proving language skills must be approved by the FEE Doctoral Study Board.

Within the framework of the doctoral study, students are obliged to publically publish the original results of their Dissertation. All the following requirements must be met:

- Publication must be in a journal with impact rating – every student of the doctoral study programme must have at least one publication in a journal with an impact factor according to the Web of Science by the time an application is submitted for defence of the Dissertation. The following conditions must be met:
    - the topic of the published article must be relevant to the topic of the Dissertation
    - the student on the doctoral study programme must have a majority share in the published article – the majority share means being stated as the first or second author in the list of authors of that article,
    - the article must be published or have the confirmed status "accepted for publication"

  and/or be the inventor or co-inventor of a patent.

Publications in conference proceedings – each student on the doctoral study programme must have at least three articles published in the proceedings of international conferences which are stored on the database of the Web of Science, Scopus, IEEE or ERIH, and the following conditions must be met:

- the topic of the published article must be consistent with the topic of the Dissertation, in the case of articles with multiple authors, the Art. is calculated by proportional part and as an ideal the student should have a co-authorial share,
- the supervisor and the consulting specialist are not considered as co-authors,

and/or be the inventor or co-inventor of the utility model.

- Other publishing activities – the number of other publications is not limited; their quality and quantity is taken into account in the overall student evaluation during the State doctoral examination and defence of the Dissertation.

The international dimension of studies is demonstrated by a doctoral student as follows:

- by a minimum stay of three months abroad (a one-month stay in the case of part-time students) at a university or research center or workplace whose professional activity is in accordance with the Dissertation topic; or
- by a documented work in an international team of at least 6 months. The work in an international team of researchers is proven, e.g. by orders for business trips, demonstrable joint work results, etc

In exceptional cases, the Dean may, following a proposal from the FEE Doctoral Study Board, decide on another manner of meeting or proving the requirements.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 2 - incomplete text)

Template of Individual study plan:
https://www.fel.zcu.cz/en/Students/PhD/isp.html

Subject anotations – see attachment 1

4.7 Examinations

A specialist examination (or resit) is conducted by the teacher of the specialist course, unless the Dean appoints an examination committee. The specialist examination is open to the public.

The examiner or examination committee member must be a leading specialist with academic titles including PhD, who actively conducts research in the relevant field.

Following a consultation with the student, the date for taking a specialist course examination (or resit) is set by the examiner or the chair of the examination committee.

If the student fails the specialist examination, he/she can take the first resit. If the student fails his/her resit, the Dean, based on the recommendation of the supervisor and Doctoral Study Board, can grant the student's application and allow for a second resit, which takes place in front of an examination committee proposed by the Doctoral Study Board and appointed by the Dean.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VI, Art. 81 - 83)

4.8 Assessment of the examination (resit)

The result of the specialist examination (resit) is assessed by the examiner(s) with the grades: "Passed", "Failed".

The result of the examination (resit) is recorded by the examiner in the student record book together with the date and signature. If the examination (resit) took place in front of a committee, signatures of all its members must be entered in the examination protocol. The assessment of the examination (resit) with the result "Failed" is not recorded in the student record book. The Dean can decide whether an official copy of an entry in a student record book verified by the faculty will be considered a student record book.

Based on the recommendation of the supervisor and Doctoral Study Board, the Dean can grant an application for recognition of an examination taken during previous doctoral studies at UWB or another higher education institution.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VI, Art. 84)

Completion of theoretical and professional courses must be evidenced by a record in the student record book plus a record of the course examinations taken. The record of the course examinations must be submitted by the student to the Study Office within three working days of the examination being taken.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 1 - incomplete text)

Template of Registration of the Course Examination:
https://www.fel.zcu.cz/en/Students/PhD/isp.html

4.9 Electrical Engineering and Informatics Conference

Doctoral students regularly take part in the Electrical Engineering and Informatics Conference organized by FEE of the University of West Bohemia; the conference serves to present and evaluate the state of scientific and research activities in doctoral study programmes. Active participation is mandatory for students in the second and third years of study; for students in other years of study, participation is recommended. Non-participation in this conference may be taken into account in the annual evaluation of the student.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 1 - incomplete text)

The conference is usually held between October and November at the training centre of the University of West Bohemia at Nečtiny castle. Details on the structure of presented papers, organization of the conference, the date and conference fee can be found on the conference website.

Conference webpages (in Czech language):
https://ei.fel.zcu.cz

4.10 Annual Report

Within 15 days following the end of every academic year at the latest, the supervisor delivers his/her annual evaluation of a student to the Doctoral Study Board.

The Doctoral Study Board then discusses this evaluation and proposes to the Dean:

- the Doctoral Study Board then discusses this evaluation and proposes to the Dean,
- the continuation of studies with some changes to the individual study plan, or
- the termination of studies.

The Dean considers the proposal of the Doctoral Study Board and decides on either the continuation or termination of studies.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VI, Art. 86)

Template of Annual Report
https://www.fel.zcu.cz/en/Students/PhD/isp.html

4.11 Change of the form of the study, interruption of the study

The Dean can grant a student's application for a change in the student's form of study. Before considering the application, the Dean will request the opinion of the supervisor.

The Dean can grant a student's application for the interruption of studies. Before considering the application, the Dean will request the opinion of the supervisor.

The student's studies can be interrupted repeatedly. The total duration of all interruptions within a given study programme / branch of study must not exceed 24 months, unless the Dean decides otherwise.

The student is entitled to have his/her studies interrupted for reasons of pregnancy, childbirth and parental leave. This applies to the whole period of parental leave, even in case of children placed in the substitute custody of the student under the decision of a relevant administrative entity pursuant to the Civil Code or the legislation governing state social support. The interruption of studies is not included either in the total duration of interruption of studies or in the maximum duration of study.

The duration of interruption of studies is not included in the deadline for applying for admission to the Dissertation defence.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VII, Art. 87 - 89, incomplete text)

Template of Application form:
https://www.fel.zcu.cz/en/Students/PhD/isp.html

4.12 Internship training

Students in a doctoral study programme may organize a foreign visit in cooperation with their supervisor. It is the duty of each student to inform the Study Office at UWB FEE about any foreign visit before their departure. After returning from a foreign visit, the doctoral student provides the FEE UWB Study Office and his/her supervisor with a copy of the report from the person responsible for the student's activities at the receiving institution regarding the results of his/her work and the overall progress and evaluation of the visit.

Students must contact the FEE Study Office regarding when they need to contact the ECTS coordinator at the FEE at the University of West Bohemia.

(Vice-Dean's Decree No. 3PD/2019 – On implementing study visits, internships and practical training of FEE students – incomplete text)

4.13 Dual supervision

Study in the doctoral study programme may also include cooperation with a foreign university. The conditions are determined following an agreement between the participating universities. These conditions must be in accordance with the legislation of the country and the internal regulations of the higher education institution where the study takes place.

4.14 Graduation

A student who has passed the State doctoral examination and successfully defended his/her Dissertation has duly completed his/her studies.

The Dean decides to terminate a student's studies due to his/her failure to meet the requirements arising from the study programme / branch of study, if the student:

- has failed to pass an examination in a specialist course prescribed by the study programme / branch of study even at the second resit granted to the student by the Dean,
- has failed to pass the State doctoral examination even at the second attempt,
- has failed to apply for admission to the Dissertation defence within the period pursuant to Art. 104, Section 2, or has failed to apply for admission to the resit of the Dissertation defence in the period,
- has failed to successfully defend his/her Dissertation even at the second attempt.

If the Dean, based on the student's annual evaluation, does not give his/her consent to the continuation of the student's studies, the Dean decides to terminate the student's studies due to the student's failure to meet the requirements stated in the relevant study programme /field of study. The date of termination of studies due to failure to meet requirements is the date on which the Decision on Termination becomes legally effective.

A student who decides to terminate his/her studies will inform the Dean about this in writing through the faculty's Study Office. This can be done at any stage of study.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. X, Art. 113 a 114 – incomplete text)

After successful defence of the Dissertation, the graduate delivers, a form indicating completion of the student's obligations to the Study Office. The graduate is then sent to the address given in the application form for thesis defence, for the document confirming the title of Ph.D. Graduates who remain in employment at UWB must take a copy of this document to the UWB Human Resources Department.

4.15 Graduation ceremony

Graduates receive their Ph.D diploma at the graduation ceremony. In justified cases, it is possible to collect this diploma from the Study Office, possibly even before the graduation ceremony has taken place.

The graduation ceremony for doctoral graduates is perceived as an official social event and is usually held once a year. Graduates participating in the ceremony must wear appropriate clothing and academic gowns which are lent to them for this event by the Faculty. Graduates are notified of the graduation ceremony date by means of a personal e-mail sent to the addressstated on the application for the Dissertation defence.

4.16 Disciplinary transgression

A disciplinary transgression is a culpable violation of duties stipulated by legal regulations or internal regulations of UWB or its faculties. Disciplinary powers over students are vested in the Dean. The decision to impose penalties on students for committing disciplinary transgressions is made by the Dean upon the recommendation of the Disciplinary Committee.

(Disciplinary Regulations for students of the Faculty of Electrical Engineering of the University of West Bohemia – incomplete text)

Link for details:
https://www.fel.zcu.cz/en/Faculty/About-us/FEE_disciplinary_committee.html

5 THE STATE DOCTORAL EXAMINATION

The State doctoral examination (hereinafter also referred to as SDE) serves to verify the student's knowledge in the field of study. The student must demonstrate profound professional and theoretical knowledge, proficiency in methods of independent scientific work and application of new knowledge. Knowledge requirements are based on the student´s individual study plan. Part of the State doctoral examination is defence of the Doctoral thesis which the student submits in writing and is assessed by an opponent appointed by the Dean.

5.1 Application for the State doctoral examination

The student submits his/her application for admission to the State doctoral examination after:

- completing all courses
- demonstrating good command of a foreign language and
- fulfilling all the obligations given by his/her individual study plan.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VII, Art. 92, incomplete text)

Application for the State doctoral examination must be submitted by the student to the Study Office.

The application for SDE must be signed by the student and the supervisor. Together with the application for SDE, students must attach the following:

- the Doctoral thesis,
- structured professional curriculum vitae (also used during the initial introduction of the student),
- summary of publishing activities exported from OBD and certified by the supervisor and
- Study report.

The supervisor must attach the following to the application for SDE:

- a proposal of the Examination Board for the State doctoral examination and a proposal for an opponent (or opponents) for the Doctoral thesis,
- the Supervisor's report on the student's scientific activities.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 3 - incomplete text)

Template of Application for the State Doctoral Examination, Template of Doctoral thesis, Template of Proposal of the Examination Board for the State Doctoral Examination, Template of Supervisor's report on the student's scientific activities:
https://www.fel.zcu.cz/en/Students/PhD/sdz.html

5.2 Doctoral thesis

The Doctoral thesis is a brief and well-organised document of about 30 to 40 pages, which includes the following:

- an analysis of the current state surrounding the issues considered in the Dissertation,
- the Dissertation objectives,
- a description of the results achieved by the doctoral student demonstrating his/her abilities to successfully complete the Dissertation,
- directions for further investigation during completion of the Dissertation, including a proposal for the methodology,
- a timetable for work on the Dissertation, and
- a list of the student's publications related to the content and topic of the Dissertation.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 3 - incomplete text)

Template of Doctoral thesis:
https://www.fel.zcu.cz/en/Students/PhD/sdz.html

5.3 Examination Board for the State doctoral examination

The State doctoral examination is held in front of Examination Board for the SDE (SDE board, Board) committee which is appointed by the Dean. However, the supervisor has the right to attend the Board's final discussion. For a quorum, more than one half (at least four) of the members of the SDE board, including the chair or the vice-chair, must be present at the state doctoral examination.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VII, Art. 91 – incomplete text)

The SDE board consists of at least seven members.

The SDE board members include the opponent/s and other persons who must be selected from a list of experts approved by the FEE Scientific Board for examining at SDE.

All members of the SDE board must be active in the same field or a related field in which the Doctoral study programme is concentrated.

Members of the SDE board must be professors, associate professors, Doctor of Science or prominent experts from the appropriate sphere.

One member of the SDE board must be a member of the FEE Doctoral Study Board (usually the chair or vice-chair).

A maximum of three members of the Board may be from the student's training workplace. At least two Board members must be from outside UWB FEE, of which at least one Board member must be outside the UWB academic community.

The supervisor, the consulting specialist, a former supervisor or a former consulting specialist may not be members of the SDE board.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 4 - incomplete text)

The list of staff members for SDE board is presented in Chapter 1.2.7.

Template of Proposal of the Examination Board for the State Doctoral Examination:
https://www.fel.zcu.cz/en/Students/PhD/sdz.html

5.4 Evaluation of Application for the State doctoral examination

The Study Office will check the completeness of the application and its annexes. In the event of deficiencies, the application will be returned and viewed as not filed. Otherwise, the application is submitted to the guarantor of the field of study and further to the FEE Doctoral Study Board for discussion.

The study field guarantor assesses the completeness of the requirements of the Doctoral thesis.

The meeting of FEE Doctoral Study Board is usually planned between 20 August and 10 June the following year. The Doctoral Study Board assesses whether the student has fulfilled all the conditions for the State doctoral examination. In the case of a positive conclusion, the Doctoral Study Board proposes to the Dean a date for the State doctoral examination, the members of the SDE board and the opponent for evaluation of the Doctoral thesis. In the case of a negative conclusion, the Doctoral Study Board proposes to the Dean that he/she refuses the application for the State doctoral examination.

In the event of a positive recommendation by the FEE Doctoral Study Board, the Dean appoints, according to the proposal of the FEE Doctoral Study Board, an SDE board and an opponent (or opponents) for the assessment of the Doctoral thesis. The Dean may also comment during the State doctoral examination itself. In the case of a negative opinion, the Dean also informs both the Chair of the Doctoral Study Board and the supervisor of this fact.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VII, Art. 93, Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 3 - incomplete text)

5.5 Assessment of the Doctoral thesis

Upon the appointment of an opponent (or opponents), the Study Office provides the opponent/s with the Doctoral thesis so that they can formulate their evaluation. In their evaluation, the opponent/s focus/es, in particular, on the following

- the relevance and dissertability of the Dissertation topic,
- selection of the Dissertation objectives,
- choice of sources of information and selected research or development methodologies,
- the student's professional results achieved in relation to the Dissertation,
- the feasibility of the timetable for work on the Dissertation which should lead to completion of the doctoral study,
- the quality of the student's publications and other activities.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 3 - incomplete text)

Template of Assessment of the Doctoral Thesis:
https://www.fel.zcu.cz/en/Students/PhD/sdz.html

5.6 Date of the State doctoral examination

If the Dean decides that the State doctoral examination should be held, he/she will set a date within four months following the student's submission of his/her application for admission to this examination.

Students can withdraw from the State doctoral examination three working days before the exam takes place, at the latest. If students fail to take the State doctoral examination and do not provide a legitimate excuse, if their excuse is not accepted, if they withdraw from the examination after it has started or if they breach the examination rules in a serious manner, they receive the "Failed" grade.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VII, Art. 94)

5.7 Procedure of the State doctoral examination

The State doctoral examination, as well as the announcement of its result, is open to the public; however, the SDE board chair may decline access to individuals who, it is believed, might disrupt the examination. The final meeting of the SDE board regarding the result of the examination is closed to the public.

The course of the State doctoral examination and its result are entered in a report.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VII, Art. 95)

During SDE, the SDE board is assessing:

- the knowledge and skills required of the doctoral student for successful completion of these studies,
- completion of the first stage of the individual study plan,
- the Doctoral thesis and objectives based on the opponent's point of view regarding dissertability, relevance, stage of development and time feasibility,
- the quality and quantity of the student's publication outputs and other activities.

The procedure of SDE is led by the chair; in his/her absence, by the vice-chair of the SDE board.

The general course of SDE is as follows:

- opening the session by the chair or vice-chair of the SDE board,
- introduction of the student by the supervisor,
- presentation of the Doctoral thesis by the student – the student gives the title and objectives of the Dissertation, briefly presents the results achieved, states the directions and methods of further investigation leading to completion of the Dissertation and defines the timetable for completion (usually ten minutes in total),
- reading the evaluation/s by the opponent/s or an authorized member of the committee,
- discussion of the Doctoral thesis: in this part, the opponent´s questions should be answered, then the questions of the other members of the SDE board and the questions of any guests

(usually twenty minutes; a the longer discussion does not shorten the following parts, but prolongs the duration of SDE),
- verification of the student´s theoretical knowledge: questions are asked relating to the courses that the student has taken during the doctoral studies and possibly also relating to other areas pertinent to the field of study. This part of the SDE ends when the SDE board is able to agree on the student's level of theoretical knowledge,
- non-public part of the SDE board's session including a public vote on the SDE result; completion of the protocol,
- public part of the SDE board session – familiarization of the student with the result of the SDE and the protocol by the SDE board chair,
- termination of the session and archiving of the original protocol in the Study Office by the chair or vice-chair of the SDE board,
- record in the study report and a copy of the session protocol given to the student and the supervisor by the chair or vice-chair of the SDE board.
- In the non-public part of the session involving the SDE board, the current course of the SDZ is evaluated. In particular, the SDE board considers the following points:
    - whether the doctoral student has a sufficient level of knowledge and skills for successfully completing the doctoral study programme,
    - whether the topic of the Dissertation is dissertative, topical and belongs within the field of the doctoral study programme,
    - whether the submitted timetable for preparation of the Dissertation is realistic and thus a prerequisite for timely and successful completion of studies, and
    - whether the present publication and professional activity of the doctoral student is at the appropriate level.

A recommendation to update the individual study plan or to modify the objectives of the Dissertation may be part of the evaluation of the SDE board.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 5 - incomplete text)

5.8 Evaluation of the State doctoral examination

The state SDE board evaluates the candidate's performance in terms of two grades, "Passed" or "Failed". The evaluation is based on an open vote at a closed meeting on the day of the State doctoral examination; the result is announced to the student immediately after this meeting. For granting the "Passed" grade, a majority of positive votes from members of the SDE board present must be obtained.

The SDE board also evaluates the submitted Dissertation proposal and gives comments on how the candidate should proceed with his/her work on the Dissertation.

An evaluation of the State doctoral examination with the grade "Passed" is entered by the SDE board chair or vice-chair in the student record book together with a date and signature.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VII, Art. 96)

5.9 Repetition of the State doctoral examination

If the candidate's performance is unsatisfactory and he/she receives a "Failed" grade, the chair or the vice-chair of the SDE board informs the student about the requirements for the examination resit. The State doctoral examination can be re-taken only once.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. VII, Art. 97)

6 DISSERTATION AND DISSERTATION DEFENCE

6.1 Application for a Dissertation defence

A student is allowed to submit his/her application for a Dissertation defence after successful completion of the State doctoral examination. The application must be submitted within six years from registering for studies. In justified cases and with the consent of the Doctoral Study Board, the Dean may extend this period; however, for a maximum of seven years following the registration.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IX, Art. 104 – incomplete text)

An application for defence of a Dissertation should be submitted by the student to the Study Office. The application for Dissertation defence must be signed by the student and the supervisor. The student must include with the application for defence of the Dissertation the following:

- Dissertation in the electronic form (one PDF file sent by e-mail to the address of the Study coordinator for the doctoral study before submitting any printed documents), printed version of the Dissertation is not necessary,
- structured professional curriculum vitae (also used during the introductory presentation of the student at the defence proceedings),
- a list of all published and unpublished works, all presentations at scientific meetings confirmed by the supervisor and, in a separate paragraph, activities from during the course of studies.

The supervisor must attach to the application for the Dissertation defence a statement of recommendation / non recommendation for the Disseration defence and a proposal for the Board for defence of the Dissertation and a proposal for the Dissertation opponents.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 6 - incomplete text)

Template of Application for Defence of the Dissertation, template of Proposal of Board for Defence of the Dissertation:
https://www.fel.zcu.cz/en/Students/PhD/dissertation.html

6.2 Dissertation

The recommended number of pages for a dissertation is 80 to 100; the Dissertation must include the following:

- introduction with a rationale for the Dissertation topic,
- affidavit on the preservation of accepted practice in scientific work,
- theoretical background, including the current state of knowledge in Czech and foreign contexts,
- the Dissertation objectives and working hypotheses,
- scientific methods used,
- the results of the Dissertation, including the original results and the student´s published results from the research or the results obtained for publication,
- contribution made by the Dissertation,
- recommendations for any further work in the research,
- a conclusion summarizing the main results of the research,
- Summary of the Dissertation in Czech, English and usually also in another world language,
- bibliography,
- a list of the student's published work and their possible outcomes,
  if the Dissertation was developed as part of a larger research project undertaken by a research team, it must include a statement by the main project researcher or the project researchers that the student is the sole author of the part of the research work that he/she is submitting, including the percentage of the student share in the whole project.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 6 - incomplete text)

The Dissertation is written in the language in which a given doctoral programme is accredited and offered. The Doctoral Study Board may permit the writing of the Dissertation in a different language.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IX, Art. 98 a 99 – incomplete text)

Template of the Dissertation:
https://www.fel.zcu.cz/en/Students/PhD/dissertation.html

6.3 Publication of Theses

Pursuant to Act No. 111/1998 Sb., on Higher Education Institutions, as amended, (hereinafter referred to as the "Act"), to the Intellectual Property Act and to the regulations governing the obligations of UWB related to data disclosure, UWB shall publish the thesis with reports and records on the course and results of the defence via the thesis database.

Firstly, the student shall log in on the website http://portal.zcu.cz, go to the menu "My Study" and open the sub-menu "Final Thesis". He/she shall then fill in the form "Data Completion" and upload the thesis in PDF format.

Subsequently, the thesis shall be checked via the anti-plagiarism system Theses.cz. Based on the results thereof, the supervisor indicates the "Similarity Assessment"

(Rector's Directive No. 33R/2017 – Publication of Theses - incomplete text)

As soon as the End-Of-Study Thesis (Dissertation) is verified by the Theses.cz system, the supervisor will immediately check the result of verification and incorporate the results into the assessment of the End-of-Study Thesis. Depending on the results of verification, the supervisor may mark the thesis with a sign of similarity assessment for the given End-of-Study Thesis. The options "Assessed" and "Assessed – Suspicious Match" are available.

In the event that the supervisor marks the End-of-Study Thesis with the sign "Assessed – Suspicious Match", he/she will not recommend it for defence due to the match and informs the vicedean for science. The vicedean for science, in accordance with the Disciplinary Rules of the Faculty, recommends the Dean of the Faculty to initiate disciplinary proceedings. The disciplinary proceedings will be held on the basis of a proposal by the Dean and the defence procedure will be suspended until the decision from the disciplinary proceedings becomes effective.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 6a - incomplete text)

6.4 Opponents of the Dissertation

The Dissertation must have at least two opponents.

An opponent of the Dissertation may be a professor or an associate professor. In exceptional cases, an opponent may also be a prominent expert approved by the FEE Doctoral Study Board. At least two opponents must be from outside the UWB academic community. At least two opponents must be professors or associate professors.

If a specialist from the applied sphere is proposed as an opponent, there must be some justification for the choice. The Dean may request his/her CV or a list of publications or other professional activities.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 7 - incomplete text)

The supervisor or consultant specialist cannot become an opponent.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IX, Art. 103 – incomplete text)

6.5 Board for defence of the Dissertation

Board for defence of the Dissertation (hereinafter referred to as "Board") has at least seven members and eleven members at the most.

The members of the Board are opponents and other persons who must be selected from the list of Dissertation defence experts approved by the FEE Scientific Board.

All members of the Board must be active in the field or related fields of the doctoral study programme.

The Board consists of the chair, the vice-chair and other members. The chair or vice-chair must be a member of the UWB academic community.

Other members of the Board are professors, associate professors and specialists from the applied sphere selected from a list of members for the Dissertation defence, which is approved by the FEE Scientific Board.

At least half of the Board members must be from outside the UWB academic community.

At least half of the Board members must be professors or associate professors.

If a specialist from the applied sphere is an opponent, there must be justification for the choice of this specialist. The Dean may request his/her CV or list of publications or other professional activities.

The supervisor, the consulting specialist, a former supervisor or a former consulting specialist may not be a member of the Board.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 8 - incomplete text)

The list of members for Board for defence of the Dissertation is presented in Chapter 1.2.7.

Template of Proposal of Board for Defence of the Dissertation:
https://www.fel.zcu.cz/en/Students/PhD/dissertation.html

6.6 Evaluation of Application for Dissertation defence

The Study Office will check the completeness of the application and its annexes. In the event of any deficiencies, the application will be returned and viewed as not filed. Otherwise, it is submitted to the study field guarantor and then to the FEE Doctoral Study Board for discussion.

The study field guarantor assesses if the requirements of the Dissertation have been met.

The FEE Doctoral Study Board discusses the proposals made by the Board for defence of the Dissertation and the opponents at their next session, which is usually scheduled between 20 August and 10 June. In the case of a recommendation by the FEE Doctoral Study Board, the FEE Dean appoints, based on the proposal of the FEE Doctoral Study Board, the Board for defence of the Dissertation.

The Dean's decision on the Board for defence of the Dissertation and the opponents for assessment of the Dissertation is delivered to the chairperson of the FEE Doctoral Study Board and the supervisor.

Upon the appointment of the opponents, the Study Office provides the opponents with a copy of the Dissertation for preparation of their assessment.

The study program guarantor carries out a formal check of the assessments, as to whether they contain the particulars pursuant to Art. 107 (2) of the UWB Study and Examination Regulations. If deficiencies are found, the evaluation is returned to the opponent for revision. The opponent must return the revised evaluation within 15 days of the date of receipt of the revision request.

The chair of the Doctoral Study Board proposes the date and place of the defence immediately after receiving the opponents' reports.

The Dean then informs all the members of the Board for defence of the Dissertation, the supervisor and the student about the defence and invites them to the defence at least twenty days before it takes place. Together with the invitation, everybody receives the opponents' reports and the synopsis.

At least fourteen days before the defence takes place, the Dissertation and opponents' reports are made public at a place specified in the Summary of the Dissertation; at the Study Office of the faculty, as a rule.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IX, Art. 106, 108, Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 6 - incomplete text)

6.7 Assessment of the Dissertation by the opponent

The opponent is obliged to write an independent assessment on the Dissertation within one month following the delivery of the letter of his/her appointment as an opponent. If he/she is unable to do so, he/she must report this fact within ten days following the delivery of the appointment letter. It is not

acceptable for any opponent to replace his/her report with a statement that he/she shares the opinion expressed in another opponent's report.

The opponent's report contains:

- an evaluation of the contribution of the Dissertation to the relevant field of study,
- his/her opinion on the problem-solving procedure used, methods applied and achievement of the defined objectives,
- his/her opinion on the results of the Dissertation and the specific original contribution of the author of the Dissertation,
- comments on the systematic approach, clarity, layout, language and other formal aspects of the Dissertation,
- comments on the student's publications,
- an unambiguous statement from the opponent stating whether he/she does or does not recommend the Dissertation for defence.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IX, Art. 107 – incomplete text)

Template of Assessment of the Dissertation:
https://www.fel.zcu.cz/en/Students/PhD/dissertation.html

6.8 Withdrawal from the Dissertation defence

Students can withdraw from the defence three working days before the defence takes place, at the latest. If students fail to attend the defence and do not provide a legitimate excuse, if their excuse is not accepted, if they withdraw from the defence after it has started or if they breach the defence rules in a serious manner, they receive the "Failed" grade.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IX, Art. 109)

6.9 Procedure of Dissertation defence

The defence of the Dissertation is led by the chair and, in his/her absence, by the vice-chair of the Board for defence of the Dissertation.

The supervisor or his/her representative nominated by the Doctoral Study Board is obliged to take part in the defence.

The defence as well as the announcement of its result are open to the public; however, the chair may decline access to individuals who, it is believed, may disrupt the defence. The final meeting of the Board for defence of the Dissertation regarding the result of the defence is closed to the public. In addition to the Board for defence of the Dissertation members, the supervisor (or his/her representative nominated by the Doctoral Study Board), the chair of the Doctoral Study Board, the Dean and the administrative officer of the faculty's study department may also participate in the final meeting of the Board for defence of the Dissertation.

A record is made of the course of the Dissertation defence and of its result.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IX, Art. 110)

The recommended length of the Dissertation defence is usually 90 minutes; 20 minutes is normally intended for presentation of the Dissertation results by the student.

In the case of contradictory and negative opinions, it is necessary to provide detailed justification of a successfully defended Dissertation in the minutes of the defence.

(Dean's Directive No. 2D/2019 On the implementation of the doctoral study programme, Art. 9 - incomplete text)

6.10 Evaluation of Dissertation defence

The Board for defence of the Dissertation evaluates the defence with one of two grades: "Passed" or "Failed". The evaluation is based on a secret vote at a closed meeting on the day of the defence; the result is announced to the student immediately after this meeting. For granting the "Passed" grade, a majority of positive votes from members of the defence committee present is necessary. The grade granted is entered by the chair into a protocol together with the date and his/her signature. The chair

of the Board immediately informs the Dean about the result of the defence and the Dean communicates the result of the defence to the Faculty Scientific Board at its next meeting. After the defence, the Dissertation, including a record of the course of the defence, its result and Assessment of the Dissertation by opponents, is transferred to the UWB University library.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IX, Art. 111)

6.11 Procedure Following an unsuccessful defence

If a student fails to defend his/her Dissertation at the first attempt, the candidate is obliged to apply for the next attempt no sooner than six months and no later than one year following the date of the unsuccessful defence. The defence can be repeated only once.

The Examination Board for the defence of the Dissertation decides whether revising the Dissertation is a condition for repeating the defence; the Board can further define the manner and extent of revising. If a revised Dissertation is submitted at the second defence, the opponents are obliged to provide an independent report on the Dissertation within one month following its delivery.

The student signs the protocol on the course of the Dissertation defence, stating that he/she has been informed about the Board's assessment of his/her Dissertation, and with provisions.

(Study and Examination Regulations of the University of West Bohemia Dated 13 July 2017 - Part three, Ch. IX, Art. 112)

ATTACHMENT 1

LIST OF SUBJECTS IN ENGLISH LANGUAGE

DEPARTMENT OF POWER ENGINEERING

KEE/XARPS Automatisation, operation and control in electrical substations
doc. Ing. Lucie Noháčová, Ph.D.

The course deals with the function of the electrical substation from the point of view of control of the electricity system, the solution of control of electrical stations with and without operators, the role of the information and logical control system, the development of control systems based on technology, the solution of pre-emergency, emergency and emergency conditions, partial and complex automatisations and integration of control of electrical substations.

KEE/XAUS Analysis of steady states in electrical networks
doc. Ing. Pavla Hejtmánková, Ph.D.

The course deals with current, voltage and power output ratios in n-node electrical networks of various complexity and voltage levels, with theoretical analysis of load flow calculation, with optimization calculations of load flow, with solution of various operating and fault symmetrical and asymmetrical states, with calculation methods for solving of networks of various complexity levels and with application of mathematical methods to the solution of load flow calculation.

KEE/XDEE Electric Power Distribution
doc. Ing. Miloslava Tesařová, Ph.D.

The course deals with the distribution of electricity with respect to the design, operation and controlling of distribution networks, public as well as industrial ones. The course is focused on the following topics: network configurations, neutral arrangement and its impact on network operation, design and sizing of network elements, economical loading of feeders and distribution transformers, distribution system voltage regulation, quality of power supply, connection requirements and network disturbances caused by special loads and generating plants. The cource also responds to topical problems of the distribution systems, e.g. the impact of decentralized generation on the design, operation and control of distribution networks, implementation of new technologies.

KEE/XEPTZ Electric power engineering for fixed traction equipment
doc. Ing. Lucie Noháčová, Ph.D.

The subject includes the issue of electrical dependent traction in the current conditions of the Czech Republic. Emphasis is placed on SS and ST traction distribution devices, including traction lines. Students will get acquainted with practically modern trends in the field of fixed traction equipment, design of ČD traction line assembly for SS system 3kV and alternating system 25kV (public transport 650V and 750V), control of voltage and current ratios for individual types of el. traction, with ways of powering traction from the Energy System of the Czech Republic, including the resulting unsymmetry.

KEE/XJI Nuclear Engineering
doc. Ing. Radek Škoda, MSc, Ph.D.

The course deals with applied modern nuclear technologies; principles and specifics of their operation, benefits and use. It presents fission nuclear reactors, their types and historical development, physics related to them, materials of nuclear reactors, special technologies and new concepts. It describes nuclear power plants, primary and secondary circuit, scheme of nuclear power plants and details of individual structural parts and components, fuels and the influence and application of NPPs in the electrical system. Emphasis is placed on the safety of nuclear installations under applicable legislations. Other nuclear technologies are also presented (eg fusion technologies, particle accelerators, nuclear propulsion, military and space applications, use of ionizing radiation in medicine, industry and others). An overview of aspects of nuclear facility construction, licensing and economics is provided. The course also focuses on advanced calculations of reactor physics (diffusion and transport equations, nonlinear dynamics of nuclear reactors, advanced control of long-term reactivity). Students are acquainted with deterministic and Monte Carlo computational codes and specific application codes MCNP, Serpent and UWB1.

KEE/XMPS Modeling of parts and elements of the electrical system
doc. Ing. Karel Noháč, Ph.D.

Subject deals with modern trends in mathematical and analog simulation in the field of power engineering at production, transmission, distribution and consumption of electricity. Including models of selected electrical

equipment in modeling of the electrical system operating and fault conditions. Solution of special events (no-load conditions, small loads, overloads, short circuits, overvoltages, impulse currents, etc.) for symmetrical and asymmetrical, steady states and transient events and their responses in the operation and control of the electrical system.

KEE/XNRP Design and implementation of electroheat processes

Ing. David Rot, Ph.D.

The course deals with designing and implementing electroheat processes, especially in induction heating, through current trends and technologies. The course aims to transfer students the necessary theoretical and practical experiences necessary to implement practical applications such as induction hardening, annealing, melting of metals, and metal oxides. From a theoretical point of view, students will get acquainted with the design of electrothermal processes in the environment of ANSYS ELECTRONIC DESKTOP (Maxwell 3D and ICEPACK) and Wolfram Mathematica. From a practical point of view, students will try the implementation of theoretically designed experimental processes.

KEE/XOPTE Optimization of thermal power plant operation

doc. Ing. Emil Dvorský, CSc.

The course deals with the analysis of the issue of increasing the efficiency of thermal power plants. Special emphasis is placed on verifying the possibilities of heat recovery into the heat recuperation and carnotization of the cycle, as well as reducing the power plant's own consumption.

KEE/XPJRC Nuclear Reactor Fuels and Nuclear Fuel Cycle

doc. Ing. Radek Škoda, MSc, Ph.D.

The course acquaints students with the basics of known nuclear fuel cycles, including the various processes that the fuel cycle involves and the basic physics. The course is also focused on innovated nuclear fuels and improving existing nuclear reactor fuels. The course describes all the steps of the military and civilian fuel cycle - the front end, irradiation of fuel and its storage and the back end of the fuel cycle. Operation of nuclear fuel processing equipment and materials produced by these equipment is also covered. Non-oxide nuclear fuels, their production and properties are presented. Emphasis is placed on the parameters and limits of current nuclear fuels and the possibilities of their improvement (thermal conductivity of fuels, its measurement and increase, zirconium coating of nuclear fuels and its corrosion, measurement of high-temperature oxidation Zr coverage and increasing the coating resistance). Students will get acquainted with the computational burnout code UWB1, its comparison with the codes MCNP and Serpent and calculations of high burnouts using the code UWB1. The course also deals with the study of burning absorbers in nuclear fuels, their use, calculations and ideal combinations.

KEE/XRREC Control and Regulation of Power Parts and Equipment

doc. Ing. Emil Dvorský, CSc.

Theory of automatic control in power industry and basic principles of linear servomechanisms. Transmission and utilisation of information in power equipment Appearing of disturbances on transmitting dates and their limitation. Utilisation of computers in power industry. Output and input parts for automatic equipment.

KEE/XSCHZ Power protection systems

Ing. Jana Jiřičková, Ph.D.

The course deals with the general theory of protection and security of electrical power system, determining the conditions for identification of emergencies and fault conditions, modern protection systems (digital protection, protection systems, peripherals), the issue of protection cooperation at different levels of protection and protection coupling systems, comprehensive design protections, their setting and adaptation to the protected equipment.

KEE/XSPES Reliability of Electric Power Systems

doc. Ing. Zbyněk Martínek, CSc.

Reliability of Electric Power Systems (KEE / XSPES)
Course deals with practical and theoretical information for ensure continual and reliable power supply to all demand places in required power and in required quality (with respects of ISO 9000 and ISO 14 000), due to customers' requirements, which is provided by electric power supply system in Czechia, reliability of electric power plants in Czechia, reliability of cogeneration production, definition of reliability metrics in power supply stations and power supply lines, modelling of elements and identification of failures at simple and advanced reliability systems, which do not repair after failure, modelling of elements and identification of failures at simple and advanced reliability systems, which repair after failure.

KEE/XTAPZ Theory and analyzes of electrical switching devices and equipment
Ing. Jan Sedláček, Ph.D.

The course is focused on electrical switching devices and equipment. It expands and deepens the theoretical basis for selected switching devices and equipment in connection with the applied physical phenomena and design solutions. Computational analyzes of the discussed devices and equipment using mainly numerical methods are connected to the theoretical basis. Depending on the equipment type, the analyzes include electromagnetic field, heat transfer, single and multiphase flow and their interactions. The course assumes the application of selected computational analysis on a model example.

KEE/XTEZT Theory of electroheat devices and electroheat technologies
Ing. David Rot, Ph.D.

The course deals with the extension and deepening of fundamental theoretical knowledge in the field of conversion of electrical energy into useful heat (i.e., physical laws applicable to Joule heat, electromagnetic induction, electric arc, plasma, electron beams, and lasers) and the physical foundations of electroheat technologies realized in heating electrically conductive and electrically non-conductive materials. The course also focuses on computer modeling of physical phenomena arising during heating loads to choose the right type of heating and optimize technological heating. The course also contains principles for assessing electroheat devices' effects on the power supply network and the living and working environment.

KEE/XTVN High Voltage Techniques
doc. Ing. Eva Müllerová, Ph.D.

The course will explain the principle of insulation coordination as a tool for determining the requirements for electrical strength of equipment with respect to the operating conditions of the environment and the characteristics of protective elements used, key terms related to voltage tests and test laboratory equipment will be defined. Furthermore, the physical mechanisms of sparkover and puncture will be analyzed with respect to the application of knowledge in the process of assessing the electrical strength of equipment. Overview of systems for generating high alternating voltage, measurement and diagnostics of partial discharges, advanced methods of discharges evaluation. Design of circuits generating impulse voltage, transients on lines and their interaction with high voltage equipment, the effect of overvoltage shape on the behavior of insulation. Special types of impulse tests. Power supply unit for DC voltage tests. Systems for recording and evaluation of voltage stress tests, the importance of statistical processing of test results, the influence of the used test class on the explanatory power of the results. Selected high voltage applications – lightning protection, medicine, materials technology, automotive industry.

DEPARTMENT OF ELECTRONICS AND INFORMATION TECHNOLOGY

KEI/XCZS Digital Signal Processing
doc. Dr. Ing. Vjačeslav Georgiev

The doctoral student will gain knowledge in the field of digital signal processing, design of components enabling digital signal processing, signal processors (fixed and floating point), programmable logic arrays, discrete transformations (DFT, FFT), digital filtering. Typical digital signal processing applications are selected for illustration.

KEI/XEBI Electronics in Biomedical Engineering
Ing. Zuzana Petránková, Ph.D.

Biomedical signals characteristics, their time domain, amplitude, spectrum and requirements for their processing. Analogue circuits, amplifiers, specific parameters of analogue circuits for biomedical applications, analogue filtration, biomedical signals sensors and processing of their outputs, transmission of biomedical signals in analogue form. Sampling of analogue biomedical signals, conversion to digital form, specific parameters of converters for biomedical signals, digital filtering of biomedical signals, design of digital filters for medical applications, processing of biomedical signals in digital form, autocorrelation, spectral analysis, decimation, interpolation, transmission of digital biomedical signals, coding, modulation and telemetric transmission of biomedical signals. Adaptive systems in biomedical applications, identification of object parameters, stability. Electronic medical devices for direct measurement of one-dimensional biomedical signals, electrocardiograph, electroencephalograph, electromyograph. Systems for non-invasive measurement of some important physiological parameters, plethysmograph, pressure measurement, gas analyzers for the analysis of exhaled air, exercise testing principles and their evaluation. Safety requirements and electromagnetic compatibility requirements for medical devices. Medical imaging - principles, detectors,

and electronics. Computed tomography, nuclear magnetic resonance, positron nuclear resonance, ultrasonography, sensing and measurement of surface temperatures (thermography), imaging of organs with an actively stored isotope (scintigraphy). Methods and electronic circuits for image processing, introduction to the theory of multidimensional discrete biomedical signal. Perspective electronic components for biomedical applications design.

KEI/XEFI Development of electronics for physics instrumentation
Ing. Petr Burian, Ph.D.

The course deals with the design of electronic system and software in physics instrumentation domain. From viewpoint of instrumentation, emphasis is put on detecting ionizing radiation, mainly on current modern hybrid pixel detectors. Also questions related to precise time measurement and synchronization are considered.In respect of electronics, the course is focused mainly on the design of system based on using programmable logic devices and modern SoC (System-on-Chip) devices. Students should get knowledge related to fast data processing in hardware resources and using fast serial communication interfaces. In course, the important trends of radiation hardened system are discussed as well. Students of this course can join the research UWB team and cooperate on real projects with our partners(CERN, IEAP CTU).

KEI/XEMCS Electromagnetic compatibility of electronic systems
doc. Ing. Jiří Skála, Ph.D.

The subject deals with theoretical and practical methods to achieve satisfactory electromagnetic immunity and low electromagnetic interference of electronic equipment. It focuses on the use of numerical methods and their application for calculations of electromagnetic compatibility problems. Presents knowledge for solving simulations of circuits with distributed parameters and modelling of the electromagnetic fields around various radio-frequency structures. It introduces the basic interference sources, interference couplings and method to eliminate them in the design and construction of electronic devices. It presents the most important recommendations, standards and suitable measuring and testing methods for electromagnetic compatibility. The main goal of the subject is solving of problems according to the topic of the doctoral thesis.

KEI/XENZ Electronic power supplies
doc. Ing. Jiří Hammerbauer, Ph.D.

The course deals with the power supply circuits of modern electronic systems. It contains mainly voltage and current switching power supply and systems, their design, simulation, construction and modern approaches to EMC issues, how to use PFC correction circuits and their topology. Emphasis is placed on the use of modern control circuits for switching power supplies from global manufacturers with practical implementation in consumer and industrial electronics systems, including UPS backup systems for computer systems. Part of the course is devoted to charging the most commonly used batteries, their properties and methods of charging.

KEI/XES Electronics Systems
doc. Dr. Ing. Vjačeslav Georgiev

The scope of the subject is wide. The choice of topics and literature is individual and is discussed with students and their advisers. The student´s specialisation and supposed theme of future dissertation are respected.Survey of modern analog devices and their features. Stability, frequency responses, feedback corrections, thermal stability. Characteristics of signal in time and frequency domain. A/D converters suitable for control systems and for signal digitisation. Phase-locked loop. Frequency synthesis. Active filters. Switched-capacitor circuits. Noise and interference in analog systems. Simulation programmes, PSPICE.Survey of modern digital devices and their features. Theoretical issues of the analysis and synthesis of digital circuits and systems. Combinational and sequential circuits. Programmable logic circuits. Digital circuits and systems for signal processing. Systems with enhanced reliability. Fault tolerant backup systems. Principles of the design of bus-oriented systems. Interference in digital systems.

KEI/XKD Error Detection and Correction Coding
doc. Dr. Ing. Vjačeslav Georgiev

The doctoral student will gain theoretical knowledge in the areas of information theory, types of coding, security and self-healing codes, compression and cryptocodes. Anthropy as a measure of information. Communication channels. Binary linear codes. Hamming codes. Code construction. Reed-Muller codes. Cyclic codes. Generating matrices and polynomials. Control matrices and polynomials. BCH and Reed-Solomon codes. Convolutional codes. Encryption.

KEI/XMIS Microprocessor Systems
doc. Ing. Martin Poupa, Ph.D.

The scope of the subject is wide. The choice of topics and literature is individual and is discussed with students and their advisers. The student´s specialisation and supposed theme of future dissertation are respected.Computer circuits and systems. Single-chip microcomputers and microcontrollers. Internal circuits, their structure and use. Analog inputs/outputs. Special architectures - signal processors, processors for measuring systems. Multiprocessor systems, arbitration. Communication between microcontrollers, industrial buses. Programming of the tasks typical for control and signal processing in Assembler and C. Hardware and software reliability, redundancy, diagnostics.

KEI/XMMS Multimedia Systems
Ing. Ivo Veřtát, Ph.D.

Introduction to multimedia systems, physiology of perception of multimedia content, source signal compression, colorimetry and color spaces, acoustics and multi-channel sound systems, current development of multimedia technologies, measurement of technical parameters of multimedia systems, methods of digital processing of multimedia signals, methods of quality evaluation of multimedia content perception, digital radio broadcasting, digital TV broadcasting, analog and digital interfaces in multimedia. systems

KEI/XRA Radioengineering
Ing. Richard Linhart, Ph.D.

Radio-frequency electromagnetic field. Electromagnetic wave propagation. Radio waves. Information transmission. Antenna technology. Radio channel models. MIMO systems. Analog modulation. Discrete modulation in baseband and with carrier, QAM and OFDM systems. TDMA, FDMA, CDMA, SDMA, FH, spread spectrum systems. Source and channel coding. Design of radioelectronic systems. Components for radio engineering. RF amplifiers, linear circuits. Selective circuits. Non-linear circuits. Mixers. Modulators. Demodulators. Power radio technology, industrial applications. Receivers and transmitters. Digital signal processing. SDR, Cognitive radio. Satellite communication and navigation systems. GPS, Galileo. Mobile communication systems. Cellular systems. DECT, GSM, UMTS, LTE, 5G, UWB.

KEI/XSPLO Systems with programmable logic circuits
doc. Ing. Martin Poupa, Ph.D.

The subject deals with the design of modern electronic systems with programmable logic devices (HW and SW). The main focus is on methods and languages suitable for design of digital systems with FPGAs (synthesis and simulation). Applications are mainly focused on digital signal processing.

DEPARTMENT OF ELECTRICAL AND COMPUTATIONAL ENGINEERING

KEP/XAAEZ Acceleration of algorithms on embedded devices
Ing. Petr Kropík, Ph.D.

The course deals with the problem of accelerators of special algorithms for microcontrollers. During the study, the student will learn the problematic of accelerators (neural networks, optimization algorithms, audio or video accelerators) on the platform of microcontrollers. The student will be acquainted with the procedures for processing and transmission of image and sound at the level of microcontrollers. The student will also be acquainted with the principles of edge computing and offline programming on microcontrollers and with procedures for immediate data interpretation. Furthermore, during the study, attention is also paid to the robustness and stability of embedded solutions.

KEP/XED Classical Electrodynamics
doc. Ing. David Pánek, Ph.D.

The student will deepen their knowledge of theoretical electrical engineering in the course. They will get acquainted with advanced methods of analysis of electrical circuits and with the possibilities of their implementation. The student will learn methods for solving non-stationary problems in the field of circuits with distributed parameters (homogeneous lines, microwave circuits). They will also get acquainted with the principles of propagation and generation of electromagnetic waves in the open environment and in waveguides. Attention will be paid to understanding the connections between different types of description of physical phenomena (circuits with concentrated and distributed parameters, models based on the description of electromagnetic wave propagation).

KEP/XLEA Linear electromagnetic actuators
Ing. František Mach, Ph.D.

Linear electromagnetic actuators for macro-and micro-systems for robotics and automation are the primary subject of the course. The curriculum is focused on fundamental physical principles, mathematical modelling and simulation, structural design, choice of materials, technological production processes and experimental verification. Students work on an individual project on the design, construction, and experimental validation of a specific electromagnetic actuator.

KEP/XMEP Electrothermal problems modeling
doc. Ing. Václav Kotlan, Ph.D.

The student will be acquainted with the formulation and solution of electrothermal problems. Special emphasis will be placed on the description of the sources of the temperature field and the boundary conditions. On practical examples of real problems, the student will get acquainted with the possibilities of associating individual physical fields and their mutual influence of electromagnetic fields, temperature fields and fields of thermoelastic or plastic deformations. During the study, the student will also learn the basics of working with simulation tools and formulating problems in them. An integral part of the course is the work with results, their analysis and the possibility of further development of problems, for example in the form of optimization techniques.

KEP/XOE Optimization in electrical engineering
prof. Ing. Pavel Karban, Ph.D.

The course deals with deterministic and stochastic optimization algorithms (gradient and simplex methods, evolutionary algorithms, algorithms inspired by nature). During the study, the student will learn concepts such as local and global extremum, classification and regression, and parameter space constraints. Sensitivity analysis and experimental design (random, factorial and stochastic schemes) are described and demonstrated on practical examples. Attention is also paid to surrogate models (linear models, Gaussian processes, random trees, neural networks), model validation and adaptive learning.

KEP/XPMSU Computer modeling of multiphysical problems
prof. Ing. Pavel Karban, Ph.D.

The student will get acquainted with the basic methods of mathematical modeling of physical fields and their subsequent computer implementation in available programs. During the study they will learn the description of the electromagnetic field, temperature field, field of thermoelastic deformations and field of incompressible fluid flow using partial differential equations and the formulation of the relevant boundary conditions. Special emphasis will be placed on partial models, their mutual interactions and numerical methods of their solution. Illustrative examples of typical combined tasks will be presented on specific technical assignments.

KEP/XRNE Robust design in electrical engineering
doc. Ing. David Pánek, Ph.D.

The course deals with methods of robust design of electrical devices. Within of the study of this course, students will get acquainted with the necessary basics of probability theory and statistics (conditional probability, Bayesian methods, probability distribution, associated probability), learn to perform sensitivity analysis, reliability analysis, get acquainted with the possibilities of using robust design techniques together with numerical models. (especially the finite element method) of the proposed devices. During the study, the student will use the tools of simulation software and write their own programs for analysis and evaluation of design robustness.

KEP/XTEMP Electromagnetic field theory
doc. Ing. Václav Kotlan, Ph.D.

Students in this course will deepen their knowledge of electromagnetic field theory - Maxwell equations for stationary and non-stationary field. They will get acquainted with mathematical modeling of stationary electromagnetic fields. They also learn about modeling of unsteady fields, boundary problems for vectors field and electrodynamic potentials, general procedures for calculating parameters (resistance, capacitance, self and mutual inductance), especially for 2D array, methods of calculation of forces in the electromagnetic field (from the Lorentz force, from the energy, from Maxwell's stress tensor), energy balance of electromagnetic field, Joule losses, Poynting vector and skin effect theory.

KEP/XVJ High-level languages for embedded applications
Ing. Petr Kropík, Ph.D.

The course deals with the principles of design of complex applications, their architecture and documentation, focusing on embedded applications and applications for electrical engineering. The student will be

acquainted with the use of high-level programming languages optimized or compiled for microcontrollers. Attention will be paid to the design patterns usage applications creating process. During the study, the student will get acquainted with advanced algorithms and their implementation with a focus on the usage in a branch of electrical engineering. Advanced application architectures in the field of embedded development and its use will be described. During the study, the student will also be acquainted with the procedures ensuring robustness, stability and portability of microcontroller applications.

DEPARTMENT OF MATERIALS AND TECHNOLOGY

KET/XAK Acoustics

Ing. Oldřich Tureček, Ph.D.

The aim of this course is to provide the students with the knowledge of basic terms in acoustics, propagation of sound in space, basic types of sound sources and sound fields. Students will be introduced to methods of design and optimization of acoustic solutions and related measurement methods in acoustics.

KET/XDMS Diagnostics methods and systems

doc. Ing. Radek Polanský, Ph.D.

The course deals with methods and system of diagnostics of electrical machines and equipment. Students will get information in individual subsystems and diagnostic approaches of individual functional units of electrical machines, equipment. The main space will be devoted to understanding the subject of diagnostics in terms of machine operation strategy and will emphasize key diagnostic methods offline and online for collecting information about the properties of the diagnosed machine system, including innovative methods of acqusition, evaluation, data analysis and system behavior prediction. The study will also address the issues of decision-making processes in the implementation of diagnostic systems in the manufacture and operation of electrical machines, equipment and systems. The issues of new and special diagnostic procedures in the diagnostics of electrical machines will be discussed in terms of new requirements for the type of voltage, load and transmission of electrical energy. Suitable sensors and transducers for online diagnostics in power electrical engineering will be discussed. During the teaching of the subject, space will also be devoted to the issues of control of the diagnostic system in the operation of entire power units, in which diagnostics has a key role.

KET/XDPS Dielectric elements and systems

doc. Ing. Pavel Trnka, Ph.D.

The course is devoted to the study of physical principles in dielectric materials of gaseous, liquid and solid state. It is an explanation of ionization, polarization phenomena, both fast lossless and slow lossy polarizations, their interpretation, the model of double potential well, interfacial - migration polarization and its detection using the PEA method, including a description of temperature and frequency dependences. Attention is also paid to the internal electric field in dielectrics, the principles of conductivity phenomena in gaseous, liquid and solid insulators, complex permittivity and the behavior of the dielectric in an alternating electric field, including the issue of dielectric losses. Furthermore, the issue of Townsend and streamer discharge and the mechanisms of electric flashover and breakdowns are discussed. Students will gain a comprehensive knowledge of the physical processes taking place in dielectric materials under in the action of ionizing agents and electric fields.

KET/XET Electrotechnology

doc. Ing. Pavel Trnka, Ph.D.

The course provides an overview of production technologies used in the production of various subsystems of electrical equipment and machines, such as rotating machines, transformers, or various elements and materials for high-voltage equipment. The individual technologies of the production of electrical insulation systems are considered. Special knowledge from the field of technological processes of electrical equipment production is applied, including specific applications and typical representatives while respecting reliability and dimensional limits. Elements and materials are evaluated in terms of their technological properties, behavior during processing and operation concerning the context of their internal structure and the resulting parameters.

KET/XFE Physical electronics

doc. Ing. Tomáš Blecha, Ph.D.

The course is focused on the physical principles of conductive, semiconductor and dielectric materials with a focus on the crystal structure of solids, defects in crystals, the atom model, atom bonds and band energy models. Particular attention is devoted to the study of physical phenomena in semiconductor materials with respect to the construction of basic electronic components. Furthermore, the physical principles of passive electronic components realized not only by standard technologies but also by promising technologies designed for flexible and printed electronics. The course also deals with optoelectronic and electro-optical properties of semiconductor materials and the basic principles of optical communication.

KET/XKPS Contact and Interconnection Structures

doc. Ing. František Steiner, Ph.D.

Application of contact and interconnection structures in the production of electronic assemblies. Chip connection technology (first-level packaging) - thermocompression, ultrasonic and thermosonic bonding, flip chip technology, and more. Second-level packaging. Types of joints - mechanical, metallurgical and glued. Soldered joints - formation of soldered joints, physico-chemical processes, surface tension, wettability, spreadability, capillarity, intermetallic layers, diffusion. Types of solders, fluxes, solderability testing, properties of soldered joints. Methods of machine soldering - wave, reflow, vapour phase, laser, pulse (resistance) and more. Ecological aspects - lead-free soldering technologies, lead-free alloys.

KET/XMAT Materials and technology

doc. Ing. Radek Polanský, Ph.D.

The course provides an overview of materials used in electrical devices with a focus on their properties and function. The description of the selected materials is further supplemented by (i) a group of materials for special purposes, which are at present indispensable for the management and operation of a functional electrotechnical units and (ii) description of application possibilities of individual materials.

KET/XMOP Modeling and Optimization of Technological Processes

doc. Ing. Jiří Tupa, Ph.D.

Basic approaches to modeling of technological processes, mathematical and object modeling. Overview of methods based on graph theory and their applications, balance models, object modeling of processes, used methodologies and modeling languages. Mathematical methods for process optimization, optimization algorithms, methods of industrial engineering. Computer support and simulation options.

KET/XMSD Measuring systems, data acquisition and signal conditioning

doc. Ing. Tomáš Blecha, Ph.D.

Measuring chain - elements, topology, interaction with the DUT and the environment, the EMI influence. Features, errors, uncertainties – calculation, superposition and propagation in the measuring chain. Measuring systems – basic topologies and implementation, PC instrumentation, features and use. Control of the measuring systems – serial and parallel buses. Signals – parameters and characterization. Analogue and digital signal conditioning. Basic design rules of the data acquisition systems. Circuits for signal conditioning used for measurement of various quantities. Measuring amplifiers and transducers.

KET/XNVE Design and evaluation of experiments

doc. Ing. František Steiner, Ph.D.

Metrological system in the Czech Republic. Uniformity and accuracy of meters and measurements, basic measuring units, other units and their correct marking. Measurement errors and uncertainties, their causes, analysis. Propagation and calculation of uncertainties.
Theory and planning of experiments, statistical analysis of one-dimensional data (estimates of parameters of selected distributions, estimates of position and scattering parameters, their robust estimates), analysis of small samples, testing of statistical hypotheses, statistical analysis of multidimensional data (characteristics of multidimensional random variables, verification of normality), methods of analysis of variance (factor analysis), testing of outliers.

KET/XOEL Plastic electronics

doc. Ing. Aleš Hamáček, Ph.D.

The course deals with problems of prospective organic materials for electronics. The main attention is focused on the organic molecular structures, doping of organic materials, charge transfer in molecular structures, basic electrical and optical properties. Applications are focused on organic conductors for microelectronic applications, semiconductor and optoelectronic devices, solar cells and environmental sensors based on organic compounds.

KET/XPESP Components of electrical systems and operational environment
doc. Ing. Pavel Trnka, Ph.D.

The course is devoted to the description of the relationship of individual elements of electrical systems to the operating environment in which they perform their function. The degradation of materials due to the influence of the surrounding, technological and operational environment will be considered in the course, as well as the reverse negative effect of individual elements on the environment and the human organism. Methodologies for estimating the future state using aging models are described. The content of the course is the practical application and work with aging models, the principles of determining their parameters, and the relationship to online diagnostics. The use of life modeling in long-term asset management of electrical equipment and life management is discussed.

KET/XRP Process Control
doc. Ing. Jiří Tupa, Ph.D.

Industrial process management principles and theory. Representation of processes attributes; structure and parameters of systems representing the management of activities and functional units. Specification of management objectives, structural aspects of systems, their orientation. Principles of hierarchical and decentralized management. Process, its properties, environment, identification, description, analysis and synthesis of the process. Process design, evaluation, and monitoring.

KET/XSAS Signal analysis of electronic components and interconnection structures
doc. Ing. Tomáš Blecha, Ph.D.

The course deals with time and frequency representation of signals, methods of signal transformation, energy and signal power, representation of signals in continuous and discrete time with a focus on analysis of signal integrity of interconnection and contact structures and electronic components, especially in the high frequency range. The course is focused on the study of the influence of materials and production technologies on signal transmission and processing. The issue of measuring and evaluating high-frequency signals in the time and frequency domain is also solved.

KET/XSDM Structural diagnostic methods
doc. Ing. Radek Polanský, Ph.D.

The course focuses on the description of the application of advanced diagnostic methods in electrical technology diagnostics - structural analyses. Students will get acquainted with the fundamental aspects related to measurement using these methods, their classification, advantages and disadvantages. In more detail, the content of the course contain the description of separating techniques (GC, GPC), spectrometry techniques (IR, FT-IR, XRF) and in particular a group of thermal analyzes (DTA, DSC, TG, TMA, DMA). The described methods are suitably complemented by practical examples of their application.

KET/XSPEZ Reliability of electrical equipments
doc. Ing. František Steiner, Ph.D.

The course is focused on acquaintance with basic concepts and calculations in the field of theory of reliability. A necessary step towards applying computational methods and models is the definition of reliability indicators based on probabilistic estimates. Special attention will be paid to the normal, exponential, and Weibull distributions. However, they will also be included other distributions of continuous and discrete random variables. Students will also get acquainted with statistical tools used to analyze the equipment's state or model the time to product failure, including hypothesis testing, correlation, and regression analysis. Another area focuses on using graphical methods for reliability assessment, e.g., fault trees (FTA) and event trees (ETA). Attention is also paid to the issue of quality in electrical production and tools to ensure the reliability of operation and production, including evaluating the efficiency of production equipment. Students will also get acquainted with the possibilities of determining the lifetime based on the applied accelerated aging.

KET/XSPP Gas sensors
Ing. Petr Kuberský, Ph.D.

The subject is focused on various gas detection principles (optical, electrochemical, electric, mass-sensitive, thermometric, etc.) with the detailed description of both receptor and transduction mechanisms. The attention is also paid to selected analytical techniques for detection of chemical substances in gas phase. From the practical point of view, new trends in production technologies and innovative organic/inorganic sensitive materials are addressed.

KET/XTECH Technology of electronics
doc. Ing. Jan Řeboun, Ph.D.

The course deals with technologies and materials for the production of passive and active electronic components, printed circuit boards and electronic assemblies. It solves methods of production of conventional components as well as new types of components, monolithic and hybrid integrated circuits, including methods of their assembly. Materials and methods of production of single and multilayer printed circuit boards are solved, including detailed principles of surface and volume differentiation, ie methods of generating and transmitting patterns. In the field of printed circuit boards, HDI or microvia technologies are discussed. The issue of encapsulation of classic and modern components and modules, solution of terminals, contacting and assembling, technical and operational conditions of components are solved. Thick-film and thin-film production technologies, surface protections, testing and inspection with emphasis on methods of increasing reliability are solved. The course also deals with the production and operating environments, environmental cleanliness, ESD issues and diagnostics and analysis of failures of electrical components, substrates and assemblies.

KET/XTET Technologies for e-textiles
Ing. Radek Soukup, Ph.D.

This course aims to provide doctoral students with detailed information about production technologies and processes of electronic textiles, their use and the current state in the field of standardization and harmonization of smart textiles. Attention will be focused mainly on textile sensors, antennas, detection fabrics, interconnection structures, advanced production technologies for smart textiles, hybrid integration, and conventional components' encapsulation into flat and linear textiles. The emphasis will also be on smart protective clothing, gloves and footwear e-textiles for medical purposes and smart industrial textiles in terms of target applications.

KET/XTFE Printed and flexible electronics
doc. Ing. Jan Řeboun, Ph.D.

The course deals with new technologies and materials enabling the realization of electronic components and systems on flexible, stretchable or uneven substrates. Attention is focused on the additive deposition methods for the realization of interconnection, contact and component structures with the emphasis on advanced printing techniques. The course also deals with technologies for structural electronics, fully digital electronics production and materials and technologies for biodegradable electronics.

DEPARTMENT OF POWER ELECTRONICS AND MACHINES

KEV/XEKNF Electromagnetic compatibility in low frequency phenomenon
prof. Ing. Václav Kůs, CSc.

Active, reactive, deformation power. Power factor. Classification of disturbances. Rectifiers, pulse rectifiers, frequency converters: harmonic currents of these converters. Amplitude and generalized amplitude law. Network impedance, harmonic voltages. Power factor compensation and filtration devices - filters, compensation. Dynamic power factor compensation. Measurement of harmonic voltages and currents. Simulation of EMC issues. EMC and standards. Active serial and parallel filters. Influence of semiconductor converters on powered devices. Investigation of the inverter - cable - motor system.

KEV/XEPO Electric Drives
prof. Ing. Zdeněk Peroutka, Ph.D.

This PhD course deals with a mathematical modeling of electric drives. The course also introduces in detail the power circuits and modern control methods of electric drives, mainly with ac motors. The attention is also paid to specific problems in power electronics converter fed drives as drive stability, drive impact on either power supply or load.

KEV/XETR Electric Traction
Ing. Martin Janda, Ph.D.

Traction mechanics and kinematics. Losses and power parameters. Traction characteristics. Power supply systems. Types and sources of interference and its reduction. Traction drive and traction motors. Methods of torque and speed control (traction, brake) for DC and AC systems. Vehicles with asynchronous traction motors. Multi-system vehicles. Auxiliary drives of vehicles. Vehicle testing. Information for driving a vehicle.

Mechanical brake. Adhesion. Automatic vehicle control and the use of processor technology. Specific design of vehicles.

KEV/XMRP Microprocessor Control of Electric Drives and Power Electronics Converters
prof. Ing. Zdeněk Peroutka, Ph.D.

This PhD course deals with the modern digital (microprocessor-based) control units – their HW as well as SW. The main attention is paid to the control strategies of electric drives and power electronics converters and their implementation in the microprocessor-based controller. This course also covers the communications and diagnostics of the drive/vehicle system and rapid prototyping and testing of the new applications.

KEV/XMSPA Modeling and simulation in industrial applications
doc. Ing. Vladimír Kindl, Ph.D.

The aim of the course is to teach students to apply the finite element method to electromagnetic calculations in the field of industrial applications. The student will acquire the ability to simplify complex 2D / 3D models by removing irrelevant details, identifying the appropriate symmetry and choosing the appropriate solver. The student will also learn to extract important operating properties such as losses, current loads, force effects and parasitic parameters (R, L, C). Emphasis will be placed on using FE models in system simulations (e.g. electric motor, or transformer powered by an inverter, etc.), which allow to analyse the system as a whole.

KEV/XMSU Machine learning methods in electrical engineering
doc. Ing. Václav Šmídl, Ph.D.

The aim of this course is to introduce machine learning methods that are suitable for common tasks in electrical engineering: regression tasksa including non-linear ones, neural networks including deep networks, data interpolation using stochactic processes, efective global optimization via Bayesian optimization, representation of uncertainty using Monte Carlo methods (such as Hamiltonian MC) or variational approach. These methods are commonly used in artificial intelligence research but their use in electrical engineering is rare. The methods will be introduced on trivial examples for all attendees and extended to real application in induvidual consultations.

KEV/XMVE Mechanical computation in electrical engineering
doc. Ing. Miroslav Byrtus, Ph.D.

Acting of electro-magnetic forces in parts of electrical machines and electrical devices. Compensations of arising forces. Design and strength of rotors of electrical machines. Lateral and torsional vibration as a consequence of megnetic pulls Vibration of houdsings of electrical machines. Dynamic stress of transformators structures in limit cases (e.g. due to short circuit currents). Strength of bandage of electric machines (turbogenerators, machines with permanent magnets, dc machines). Eigen-frequencies and eigen-modes in electrical devices. Modelling of mechanical components using finite element methods. Modelling of dynamic behaviour and dynamic analysis.

KEV/XNRS Design of electric drives and converters control
Ing. Jakub Talla, Ph.D.

This PhD course deals with modelling and design of real-time control systems for electric drives and power converters by model based design methodology. More specifically, the course is focused on modelling of controlled physical systems and control circuits (analog and digital) with direct impact to control algorithms. For example, the course covers modelling of: nonlinear effects of converters and motors, microcontroller peripheries (A/D converters, PWM etc.), impacts of signals discretization, digital filtering, fixed-point calculations, latencies, noises etc. The second part of the course deals with design and testing of control systems and algorithms by Model In the Loop (MIL), Software In the Loop (SIL) and Hardware In the Loop (HIL) techniques and automatic code generation tools.

KEV/XPMA Advanced control methods for electrical engineering applications
doc. Ing. Václav Šmídl, Ph.D.

The aim of this subject is to introduce selected advanced control techniques such as adaptive linear quadratic control, predictive control, and approximate dynamic programming (including neuro-control and reinforcement learning) as tools for design of optimal control strategy. Some of these techniques are well established in other fields but their application in electrical engineering is just at the beginning. The methods will be explained on simple tutorial problems and further developed according to the focus of each student.

KEV/XRES Control of Electromechanical Systems

prof. Ing. Zdeněk Peroutka, Ph.D.

This PhD course deals with selected problems from the control theory of electromechanical systems with the main emphasis given on the control of electric drives and power electronics converters and power systems. This course also covers the identification/estimation of the parameters of electromechanical systems ("sensorless control" – model-based strategies, the application of different types of estimators (filters), artificial intelligence, the utilization of anisotropies, etc.).

KEV/XRVES Control of Grid Connected Converters

Ing. Jakub Talla, Ph.D.

This PhD course deals with design of control systems for grid connected converters. The course objectives are: 1) Modelling of power converters and filters interactions with the grid, 2) Design of algorithms for grid synchronization based on DFT, SDFT, PLL, FIR filters etc., 3) Design of control algorithms in rotating and stationary reference frames based on PI, PR, LQ, FCS-MPC controllers 4) Control of grid quantities: active/reactive power control, active power filtering, negative/zero sequence control, droop control etc. 5) Real-time grid parameters identification

KEV/XSES Design of Electric Machines

doc. Ing. Karel Hruška, Ph.D.

The subject is supposed to extend the knowledge of Design of Electric Machines. Magnetic circuits of electric machines, problems of their construction, usage of numerical methods to their design, losses and possibilities of their limitation. Windings of different types of electric machines, specific properties and effects on the work of the machine. Arrangements for limitation of harmonic components, effects of partial discharge and overvoltage effects. Optimization of fundamental dimensions, mass and efficiency. Parasitic effects and their limitations Magnetic pull and its calculation. Optimization of machine parameters for optimal control. Special constructional solutions of electric machines – outer rotors, axial machines. Calculation methods for special winding types of electric machines. Polyphase electric machines – winding connection, possible injection of higher order harmonic components and effects on the design of the magnetic circuit.

KEV/XSMS Statistical methods for estimation of uncertain systems

doc. Ing. Václav Šmídl, Ph.D.

The aim of this subject is to teach theory and application of statistical tools that can be used to estimate systems with unknown parameters, unknown state of structure. The basic model to study is linear regression, which is the basis of the least squares method, however it can be used to model more advanced tasks such as structure estimation. Further topics of the subject are: (i) elicitation of unknown model from the measured data, (ii) Monte Carlo methods, and (iii) methods of recursive state estimation, for example application of Bayesian filtering in electrical engineering and communications.

KEV/XSMVE Special Converters of Power Electronics

doc. Ing. Martin Pittermann, Ph.D.

The course deals with special types of high-power power semiconductor converters. Specifically, multi-level converters (especially three-level voltage inverter and rectifier), direct frequency converters (both matrix converters and cycloconverters) and special aspects of other types of converters (thyristor rectifiers and converters with current intermediate circuit) are solved here.

KEV/XTES Theory of Electrical Machines

doc. Ing. Bohumil Skala, Ph.D.

The students are competed to master theoretical field in sphere of electrical machines. The checking of the differences between model and real product. The concrete contens of this suject may be adjusted with respect to student's study curriculum. Courses of study"1. Generalised approach to fields and forces, electromagnetic torque, induced voltage2. Transformers influence of the unsymmetrical conditions. Sudden short circuit .3. Mathematical models of asynchronous machines, transient and failure conditions.4. Synchronous machines in phasor and d-q component form, transient and subtransient conditions.

KEV/XTPF Space-Vector Theory in Electric Machines

doc. Ing. Karel Hruška, Ph.D.

Space-vector theory as an analogy to complex numbers analysis used for AC circuits. Space vectors, their geometric and physical meaning. The usage of Fourier analysis for the description of electromagnetic phenomena in the air gap. The current layer of one conductor and its Fourier series. The superposition of waves of all conductors of one phase. Resulting waves as sums of all phases. Space phasor of magnetic flux in the yoke of the machine and its symbolic representation. The inductance of one conductor as a base

for determination of mutual inductances and magnetizing inductance in effect of all machine phases. The introduction of complex winding factor and its periodicity for higher order harmonic components. The transformation of space-vectors from any coordinate system to a different one. Optimal choice of a coordinate system for different types of electric machines of different control strategies. The working wave of a magnetic field in the air gap and unwanted effects of higher order harmonic components. Space vector theory as a general method for unified analysis of steady state and transient phenomena in electric machines considering higher order harmonic components of the magnetic field. Power supply from semiconductor converters, work into rectifier load. Torque of the machine. The equation of different types of machines expressed using space vectors as a general help for solution of their properties in steady state, quasi stationary and transient phenomena. Expression of mathematical models of induction and synchronous machines. Solution of non-symmetric electric machines and non-symmetric states of symmetric electric machines. Stability of electric machines.

KEV/XTVE Thermal and cooling calculations in electrical engineering
doc. Ing. Roman Pechánek, Ph.D.

Cooling techniques for electrical machines and power electronic devices. Hydraulic calculations, pressure sources, determination of pressure losses, optimization of cooling systems. Systems and fans for forced refrigerant circulation. Intensive methods of cooling electrical machines and power equipment in electrical engineering, cooling methods, types of coolers, heat pipes, and more. Transient thermal states of complex electromechanical systems. The solution of transient thermal processes in various load cycles of electrical machines and power equipment in electrical engineering. Cooling of power electronic components and heat transfer on printed circuit boards, types of cooling.

KEV/XVFS Multiphase Systems in Electric Drives
Ing. Tomáš Komrska, Ph.D.

The course objectives are multiphase systems in the field of power electronics and electric drives. Main attention is paid to generalized Clarke's transformation for multiphase systems, generation of rotating field using basic and higher harmonic components, connection of multiphase drives, vector control of multiphase electric drives, space vector modulation techniques of multiphase systems and carrier-based pulse width modulation techniques. Further attention is paid to degrees of freedom of multiphase systems and their application, generation of modulation signals based on optimization criterion, minimization of Euclidean and infinite norms.

KEV/XVPM Power electronic converters
doc. Ing. Pavel Drábek, Ph.D.

The course is focused on deepening knowledge about power electronic converters designed for industrial and traction drives. Attention is focused on modern types of converters: Voltage and current active rectifiers, Multi-quadrant and multiphase connections of DC/DC converters, voltage and current inverters with PWM modulation, direct and indirect frequency converters, AC voltage converters. The study is based on basic university professional literature and is supplemented by the study of actual works published in professional journals, proceedings and books.

KEV/XVPS Power semiconductor devices
doc. Ing. Pavel Drábek, Ph.D.

The subject deals with special semiconductor devices in power converters. For example modern devices based on Silicon Carbide can be mentioned (Schottky diodes, JFET, VJFET, MOSFET etc.) and their application in the power electronics – converters for high voltage application (e.g. multi level converters – NPC, M2LC) and current-source converters (current source active rectifiers, matrix converters etc.).

KEV/XVTDS Power Electronics Technology for Distribution Grids
Ing. Tomáš Komrska, Ph.D.

The course objectives are active filters, reactive power compensation and earth fault compensation in distribution networks with isolated and inefficiently grounded neutral using active systems based on power semiconductor converters. Main attention is paid to compensation of single-phase ground faults by active current sources, i.e. systems with power converters connected to phase conductors and to neutral of the transformer, mathematical modeling, comparison with traditional resonant passive compensation methods (arc suppression coils), identification of faulty feeder, positive and zero-sequence component, determining the size of the required compensating current.

DEPARTMENT OF PHYSICS

KFY/XFYE Physics for electrical engineering PhD students
doc. Mgr. Šimon Kos, Ph.D.

Physical basis of phenomena studied and used by the electrical engineering PhD students adjusted to their specialization. Examples of the areas covered are: subatomic physics for electronic particle detectors (quantum mechanics, atomic structure, nuclear structure, radioactivity, elementary particles and their interactions), magnetism (quantum mechanics, magnetic properties of materials, atomic magnetism, susceptibilities, magnetism models), thermodynamics (state variables, thermodynamic ensembles, thermodynamic potentials, statistical distributions, phase diagrams, chemical equilibrium, fluctuations, kinetics), semiconductors (band structure, vibrations, doping, transport, optical properties)

DEPARTMENT OF INFORMATICS AND COMPURER SCIENCE

KIV/XMPSM Modern programming styles and methods
doc. Ing. Pavel Herout, Ph.D.

The aim of the course is to gain an overview of state of the art in the field and to learn the advanced principles used in the design of large software applications with regard to increased robustness and reliability. The content is: Object-oriented analysis, design and implementation of large-scale software applications. Testing. Theory and practice of markup languages. Scripting languages. Embedded application programming.

KIV/XZSS Software systems reliability
doc. Ing. Přemysl Brada, MSc., Ph.D.

The course aims to strengthen the knowledge in the area of software safety and gain an overview of current state of the art in related research. Topics include: Concepts, elements and properties of software architectures, their modeling, use of models in the implementation and verification of software-intensive systems, their relation to software quality attributes. Models and methods of computer and software system reliability, performance and safety, improving robustness of software-intensive systems, processes and techniques of safety-related software devlopment, principles and methods of testing.

DEPARTMENT OF CYBERNETICS

KKY/XTR Control Theory
prof. Ing. Miloš Schlegel, CSc.

The course contains basic tasks of contemporary linear control theory and methods of their solution. First, attention is paid to the relevant mathematical tools. Then there is an overview of classical, analytical and optimization methods in time and frequency domain. Linear multidimensional control systems are studied (order reduction, assignment of spectral properties by state, output and dynamic feedback, LQR, H2 and Hinfinity, sliding mode control). Further attention is paid to design of controllers with limited structure (fixed order controllers) and practical aspects of their design and implementation. The main emphasis is placed on the robustness of the proposed control systems.

DEPARTMENT OF MATHEMATICS

KMA/XMAP Applied Mathematics Methods
doc. Ing. Marek Brandner, Ph.D.

The aim is to acquaint doctoral students with the use of modern mathematical methods in electrical engineering. The theoretical foundations of these methods are discussed and specific application problems are solved. The course is two-semester. Content of the winter semester: ordinary differential equations, approximation of functions, numerical methods for solving initial and boundary value problems for ordinary

differential equations. Content of the summer semester: analytical and numerical methods for solving partial differential equations, finite difference, finite volume and finite element methods.

KMA/XNMA Numerical methods and applications
doc. Ing. Josef Daněk, Ph.D.

The course is focused at parts of numerical mathematics.Topics of this course include:direct and iterative methods for linear systems with aplications for solution of partial differential equations, methods of matrix decomposition, conjugate gradient method, preconditioning, approximation of functions, finite elements method, multigrid and domain decomposition methods.

KMA/XPAS Probability and statistics
RNDr. Blanka Šedivá, Ph.D.

Basic topics
Probability theory, Discrete Random Variables and Probability Distributions, Continuous Random Variables and Probability Distributions, Join Random Variables and Probability Distributions, Descriptive statistic, Random sample, Convergence concepts, Point estimation, Statistical Intervals Based on a Single Sample, Test of Hypotheses, Simple Linear regression and Correlation.
Advance topics
The Analysis of Variance, Nonlinear Regression, Multiple Regression, Logistic regression, Goodness of Fits Tests , Categorical Data Analysis, Non parametric tests of hypothesis. Simulation of random variables. Statistical Software.

DEPARTMENT OF MECHANICS

KME/XVMD Computational methods for dynamics
prof. Dr. Ing. Jan Dupal

Mathematical modelling of the dynamic continuum problems. Approximate methods of discretization. Modal analysis. Response calculations of the continua represented by self-adjointed and non-adjointed operators and by matrices (after discretization). Discretization of the beams, rotating shaft, plate and shell by means of FEM and structure modelling consisting of mentioned continua. Stress and stability analysis of non-symetric rotors and spatial body-beam systems. Numerical methods of the direct equation of motion integration. Using MATLAB programming.

DEPARTMENT OF INDUSTRIAL ENGINEERING AND MANAGEMENT

KPV/DGS Digital Production System
prof. Ing. Josef Basl, CSc.

Changes of thinking and philosophies due to the globalization and digitalization (chains, clusters, market forcibility). Necessity of digitalization of designing, planning and production control (MPM). Influence of digitalization on production cycle and process (PLM, PDM). Role and possibilities of software products. Concepts of digital enterprises in the world.

KPV/DPRS Industry 4.0/Society 4.0
prof. Ing. Josef Basl, CSc.

The course focuses on the overall philosophy of Industry 4.0. It focuses on the description and ways of implementing Cyber-Physical Systems with respect to the human factor that is inherently connected with this issue. There are introduced IoT, PLM, VR, AR, and more. The subject also deals with the impact of implementation on the company.