

PLAN OF STUDIES

FACULTY:	Electrical Engineering
MAIN FIELD OF STUDY:	Electrical Engineering
EDUCATION LEVEL:	2nd level
FORM OF STUDIES:	full-time
PROFILE:	general academic
SPECIALIZATION:	Renewable Energy Systems
LANGUAGE OF STUDY:	english
IN EFFECT SINCE:	2022/2023

Plan of studies structure (optionally)

1) in ECTS point layout

2) in hourly layout

1. Set of obligatory and optional courses and groups of courses in semestral arrangement

Semester 1

Obligatory courses / groups of courses

number of ECTS points: 27

No.	Course code	Name of course	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form of course/ group of courses	Way of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	DN classes	BU classes			University-wide	Concerning scientific activities	Practical	Type
1	W05ETK-SM1330W	Numerical and Optimization Methods	1					K2ETK_W2	15	60	2	2	1,4	T-Z	Z		DN		PD
2	W05ETK-SM1330L	Numerical and Optimization Methods			1			K2ETK_U2 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	PD
3	W05ETK-SM1331W	Power Quality Assessment	2					K2ETK_W12 K2ETK_K1 K2ETK_K2	30	90	3	3	2,1	T-Z	Z		DN		S
4	W05ETK-SM1331L	Power Quality Assessment			1			K2ETK_U11 K2ETK_K1 K2ETK_K2	15	30	1	1	0,7	T	Z		DN	P	S
5	W05ETK-SM1332W	Circuits and Systems	2					K2ETK_W1	30	90	3	3	2,1	T-Z	E		DN		K
6	W05ETK-SM1332C	Circuits and Systems		1				K2ETK_U1 K2ETK_K1	15	30	1	1	0,7	T	Z		DN	P	K
7	W05ETK-SM2131W	Power Systems Faults	2					K2ETK_W3 K2ETK_K1	30	120	4	4	2,8	T-Z	E		DN		K
8	W05ETK-SM2139P	Fault Calculations				2		K2ETK_U9 K2ETK_K2	30	60	2	2	1,4	T	Z		DN	P	S
9	W05ETK-SM3225W	Dynamics and Control of AC and DC Drives	2					K2ETK_W4	30	120	4	4	2,8	T-Z	E		DN		K
10	W05ETK-SM3225L	Dynamics and Control of AC and DC Drives			1			K2ETK_U3 K2ETK_K2 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	K
11	W05ETK-SM3225P	Dynamics and Control of AC and DC Drives				1		K2ETK_U3 K2ETK_K2 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	K
12	W09ETK-SM1501W	Advanced Technology in Electrical Power Generation	2					K2ETK_W19	30	90	3	3	2,1	T-Z	Z		DN		S
13	W09ETK-SM1501C	Advanced Technology in Electrical Power Generation		1				K2ETK_U9 K2ETK_K3	15	30	1	1	0,7	T	Z		DN	P	S
Total			11	2	3	3	0		285	810	27	27	18,9						

Optional courses / groups of courses

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	minimum		hours in semester,					ECTS points				
			lec	cl	lab	pr	sem		Number of hours		Number of ECTS points			Form of course/group of courses	Way of crediting	Course/group of courses				
									ZZU	CNPS	total	DN classes	BU classes			University-wide	Concerning scientific activities	Practical	Type	
Optional courses block: Foreign Language								ECTS			hours									
1	SJO000-SM00	Foreign language B2+ or C1+		1				K2ETK_U5 K2ETK_K1	15	30	1		0,7	T	Z	O	-	P	KO	
2	SJO000-SM00	Foreign language A1 or A2		3				K2ETK_U6 K2ETK_K1	45	60	2		1,4	T	Z	O	-	P	KO	

Altogether in semester

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for DN	Number of ECTS points for BU
lec	cl	lab	pr	sem					
11	6	3	3	0	345	900	30	27	21

Semester 2
Obligatory courses / groups of courses
number of ECTS points: 25

No.	Course code	Name of course	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form of course/group of courses	Way of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	DN classes	BU classes			University-wide	Concerning scientific activities	Practical	Type
1	W05ETK-SM2133W	Simulation and Analysis of Power System Transients	1					K2ETK_W10	15	30	1	1	0,7	T-Z	Z		DN		S
2	W05ETK-SM2133L	Simulation and Analysis of Power System Transients			2			K2ETK_U10 K2ETK_K6 K2ETK_K7	30	60	2	2	1,4	T	Z		DN	P	S
3	W05ETK-SM2137W	Protection and Control of Distributed Energy Sources 1	1					K2ETK_W9	15	60	2	2	1,4	T-Z	Z		DN		S
4	W05ETK-SM2137L	Protection and Control of Distributed Energy Sources 1			1			K2ETK_U9 K2ETK_K1 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	S
5	W05ETK-SM2331W	Renewable Energy Sources	2					K2ETK_W8 K2ETK_K6	30	60	2	2	1,4	T-Z	E		DN		S
6	W05ETK-SM2331S	Renewable Energy Sources					1	K2ETK_U9 K2ETK_K6	15	30	1	1	0,7	T-Z	Z		DN	P	S
7	W05ETK-SM2332W	Water Power Plants 1	2					K2ETK_W8	30	60	2	2	1,4	T-Z	Z		DN		S
8	W05ETK-SM2334W	Energy Storage Systems	1					K2ETK_W12	15	60	2	2	1,4	T-Z	E		DN		S
9	W05ETK-SM2334P	Energy Storage Systems					1	K2ETK_U8 K2ETK_K7	15	30	1	1	0,7	T	Z		DN	P	S
10	W05ETK-SM2536W	Integration of Distributed Resources in Power Systems	2					K2ETK_W10 K2ETK_K6	30	60	2	2	1,4	T-Z	E		DN		S

11	W05ETK-SM2536L	Integration of Distributed Resources in Power Systems				1				K2ETK_U9 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	S
12	W05ETK-SM3110W	Modelling of Electrical Machines	1							K2ETK_W9	15	30	1	1	0,7	T-Z	Z		DN		S
13	W05ETK-SM3110P	Modelling of Electrical Machines				2				K2ETK_U11 K2ETK_K6	30	60	2	2	1,4	T	Z		DN	P	S
14	W05ETK-SM3228W	Power Electronics	2							K2ETK_W14 K2ETK_K7	30	60	2	2	1,4	T-Z	Z		DN		S
15	W05ETK-SM3228L	Power Electronics				1				K2ETK_U8 K2ETK_K7	15	30	1	1	0,7	T	Z		DN	P	S
16	W05ETK-SM3229W	Electromechanical Systems in Renewable Energy	1							K2ETK_W14	15	30	1	1	0,7	T-Z	Z		DN		S
17	W05ETK-SM3229S	Electromechanical Systems in Renewable Energy						1		K2ETK_U9 K2ETK_K1	15	30	1	1	0,7	T-Z	Z		DN	P	S
Total			13	0	5	3	2				345	750	25	25	17,5						

Optional courses / groups of courses

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	minimum 175		hours in semester, 6			ECTS points					
			lec	cl	lab	pr	sem		Number of hours		Number of ECTS points			Form of course/group of courses	Way of crediting	Course/group of courses			
									ZZU	CNPS	total	DN classes	BU classes			University-wide	Concerning scientific activities	Practical	Type
1	W05ETK-SM5105Q	Diploma placement 4 weeks				40		K2ETK_U12 K2ETK_K6	160	120	4	4	2,8	T	Z		DN	P	S
Optional courses block: Management								ECTS		2			hours 1						
1	W05ETK-SM2538W	Market Mechanisms in Power Systems with Distributed Energy Sources	1					K2ETK_W6 K2ETK_K3 K2ETK_K6	15	50	2		1,4	T-Z	Z	O	-		KO
2	W05ETK-SM1499W	Fundamentals of Management	1					K2ETK_W6 K2ETK_K3 K2ETK_K6	15	50	2		1,4	T-Z	Z	O	-		KO

Altogether in semester

practice

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for DN	Number of ECTS points for BU
lec	cl	lab	pr	sem					
14	0	5	3	2	360	800	27	25	18,9
0	0	0	40	0	160	120	4	4	2,8

Semester 3

Obligatory courses / groups of courses

number of ECTS points: 20

No.	Course code	Name of course	Weekly number of hours					Learning effect symbol	Number of hours		Number of ECTS points			Form of course/group of courses	Way of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	DN classes	BU classes			University-wide	Concerning scientific activities	Practical	Type
1	W05ETK-SM1337W	Photovoltaic Cells	2					K2ETK_W13 K2ETK_K6	30	60	2	2	1,4	T-Z	E		DN		S
2	W05ETK-SM1337L	Photovoltaic Cells			1			K2ETK_U8 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	S
3	W05ETK-SM1338W	Industrial ecology - selected problems	1					K2ETK_W11 K2ETK_K3	15	30	1	1	0,7	T-Z	Z		DN		S

4	W05ETK-SM1338S	Industrial ecology - selected problems					1	K2ETK_U9 K2ETK_K3	15	30	1	1	0,7	T	Z		DN	P	S
5	W05ETK-SM2135W	Artificial Intelligence Techniques	2					K2ETK_W9	30	60	2	2	1,4	T-Z	Z		DN		S
6	W05ETK-SM2135P	Artificial Intelligence Techniques					1	K2ETK_U8 K2ETK_K2	15	30	1	1	0,7	T	Z		DN	P	S
7	W05ETK-SM2141S	Protection and Control of Distributed Energy Sources 2					1	K2ETK_U13	15	30	1	1	0,7	T-Z	Z		DN	P	S
8	W05ETK-SM2336S	Water Power Plants 2					1	K2ETK_U9 K2ETK_K7	15	30	1	1	0,7	T-Z	Z		DN	P	S
9	W05ETK-SM2537W	Legal Regulations and Investments in Power Systems with Distributed Energy Sources	2					K2ETK_W17 K2ETK_K6	30	60	2	2	1,4	T-Z	Z		DN		S
10	W05ETK-SM2537S	Legal Regulations and Investments in Power Systems with Distributed Energy Sources					1	K2ETK_U9 K2ETK_K6	15	30	1	1	0,7	T-Z	Z		DN	P	S
11	W05ETK-SM3311W	Electromagnetic Compatibility	2					K2ETK_W11 K2ETK_K7	30	60	2	2	1,4	T-Z	Z		DN		S
12	W05ETK-SM3311L	Electromagnetic Compatibility					1	K2ETK_U11 K2ETK_K7	15	30	1	1	0,7	T	Z		DN	P	S
13	W05ETK-SM3312W	Measurement methods and techniques	2					K2ETK_W5 K2ETK_K7	30	60	2	2	1,4	T-Z	Z		DN		PD
14	W05ETK-SM3312L	Measurement methods and techniques					2	K2ETK_U4 K2ETK_K7	30	60	2	2	1,4	T	Z		DN	P	PD
			Total	11	0	4	1	4		300	600	20	20	14					

Optional courses / groups of courses

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	minimum 135		hours in semester, 9			ECTS points					
			lec	cl	lab	pr	sem		Number of hours		Number of ECTS points			Form of course/group of courses	Way of crediting	Course/group of courses			
									ZZU	CNPS	total	DN classes	BU classes			University-wide	Concerning scientific activities	Practical	Type
1	W05ETK-SM5117P	Diploma Project				8		K2ETK_U15 K2ETK_K6	120	240	8	8	5,6	T	Z		DN	P	S
2	W05ETK-SM5127P	Diploma Project				8		K2ETK_U15 K2ETK_K6	120	240	8	8	5,6	T	Z		DN	P	S
3	W05ETK-SM5137P	Diploma Project				8		K2ETK_U15 K2ETK_K6	120	240	8	8	5,6	T	Z		DN	P	S
Optional courses block: Law									ECTS		1			hours 1					
1	W05ETK-SM1231W	Intellectual property rights in the world	1					K2ETK_W7 K2ETK_K3 K2ETK_K5	15	25	1		0,7	T-Z	Z	O	-		KO
2	W05ETK-SM1232W	Inventions and patents	1					K2ETK_W7 K2ETK_K3 K2ETK_K5	15	25	1		0,7	T-Z	Z	O	-		KO
3	W05ETK-SM1233W	Industrial property and copyright for engineers	1					K2ETK_W7 K2ETK_K3 K2ETK_K5	15	25	1		0,7	T-Z	Z	O	-		KO
4	W05ETK-SM1007W	Protection of Intellectual Property	1					K2ETK_W7 K2ETK_K3 K2ETK_K5	15	25	1		0,7	T-Z	Z	O	-		KO
5	W05ETK-SM1008W	International Law	1					K2ETK_W7 K2ETK_K3 K2ETK_K5	15	25	1		0,7	T-Z	Z	O	-		KO

Altogether in semester

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for DN	Number of ECTS points for BU
lec	cl	lab	pr	sem					
12	0	4	9	4	435	865	29	28	20,3

Semester 4

Optional courses / groups of courses

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	minimum 300		hours in semester, 30			ECTS points					
			lec	cl	lab	pr	sem		Number of hours		Number of ECTS points			Form of course/ group of courses	Way of crediting	Course/group of courses			
									ZZU	CNPS	total	DN classes	BU classes			University-wide	Concerning scientific activities	Practical	Type
1	W05ETK-SM5108S	Diploma seminar					2	K2ETK_U14 K2ETK_K6	30	90	3	3	2,1	T-Z	Z		DN	P	S
2	W05ETK-SM5119D	Master's thesis				12		K2ETK_U15 K2ETK_K4 K2ETK_K6	180	540	18	18	12,6	T	Z		DN	P	S
3	W05ETK-SM5129D	Master's thesis				12		K2ETK_U15 K2ETK_K4 K2ETK_K6	180	540	18	18	12,6	T	Z		DN	P	S
4	W05ETK-SM5139D	Master's thesis				12		K2ETK_U15 K2ETK_K4 K2ETK_K6	180	540	18	18	12,6	T	Z		DN	P	S
Optional courses block: Social Sciences and Ethics										ECTS	2	hours	1						
1	W08ETK-SM1721S	Ethics in bussiness					1	K2ETK_U7 K2ETK_K6	15	50	2		1,4	T-Z	Z	O	-	P	KO
2	W08ETK-SM3721S	The art of public speaking					1	K2ETK_U7 K2ETK_K6	15	50	2		1,4	T-Z	Z	O	-	P	KO
3	W08ETK-SM3821S	Social communication					1	K2ETK_U7 K2ETK_K6	15	50	2		1,4	T-Z	Z	O	-	P	KO
Optional courses block: A										ECTS	4	hours	3						
1	W05ETK-SM1230W	Visual Engineering Environments and Graphical Languages	1					K2ETK_W16	15	30	1	1	0,7	T-Z	E		DN		S
2	W05ETK-SM1230L	Visual Engineering Environments and Graphical Languages			2			K2ETK_U13 K2ETK_K2	30	90	3	3	2,1	T	Z		DN	P	S
3	W05ETK-SM1334W	Signal and Systems	2					K2ETK_W16	30	90	3	3	2,1	T-Z	E		DN		S
4	W05ETK-SM1334C	Signal and Systems		1				K2ETK_U13 K2ETK_K1	15	30	1	1	0,7	T	Z		DN	P	S
5	W05ETK-SM1335W	Advanced Signal Processing Methods	2					K2ETK_W16	30	90	3	3	2,1	T-Z	E		DN		S
6	W05ETK-SM1335C	Advanced Signal Processing Methods		1				K2ETK_U13 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	S
7	W05ETK-SM2234W	PLC and Wireless Communications for Monitoring and Metering	2					K2ETK_W16 K2ETK_K6	30	90	3	3	2,1	T-Z	E		DN		S
8	W05ETK-SM2234S	PLC and Wireless Communications for Monitoring and Metering					1	K2ETK_U13 K2ETK_K6	15	30	1	1	0,7	T-Z	Z		DN	P	S
9	W05ETK-SM2335W	Advanced Substations and Electrical Equipment	2					K2ETK_W16	30	90	3	3	2,1	T-Z	E		DN		S
10	W05ETK-SM2335P	Advanced Substations and Electrical Equipment				1		K2ETK_U13 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	S
11	W05ETK-SM2534W	Power System Modelling	2					K2ETK_W16	30	90	3	3	2,1	T-Z	E		DN		S
12	W05ETK-SM2534P	Power System Modelling				1		K2ETK_U13 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	S
13	W05ETK-SM2535W	Computer Control of Power System	2					K2ETK_W16	30	90	3	3	2,1	T-Z	E		DN		S
14	W05ETK-SM2535S	Computer Control of Power System					1	K2ETK_U13 K2ETK_K6	15	30	1	1	0,7	T-Z	Z		DN	P	S

Optional courses block: B								ECTS		3	hours		2						
1	W05ETK-SM2136W	Design of logic circuits	1					K2ETK_W14	15	60	2	2	1,4	T-Z	Z		DN		S
2	W05ETK-SM2136L	Design of logic circuits			1			K2ETK_U13 K2ETK_K1 K2ETK_K2 K2ETK_K7	15	30	1	1	0,7	T	Z		DN	P	S
3	W05ETK-SM2138W	Electrical Power Engineering – excursionary activities	1					K2ETK_W14 K2ETK_K6	15	60	2	2	1,4	T-Z	Z		DN		S
4	W05ETK-SM2138S	Electrical Power Engineering – excursionary activities					1	K2ETK_U13 K2ETK_K6	15	30	1	1	0,7	T-Z	Z		DN	P	S
5	W05ETK-SM3226W	Fuzzy Logic Control	1					K2ETK_W14	15	60	2	2	1,4	T-Z	Z		DN		S
6	W05ETK-SM3226L	Fuzzy Logic Control			1			K2ETK_U13 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	S
7	W05ETK-SM3227W	Control of Power Electronic Converters	1					K2ETK_W14 K2ETK_K6	15	60	2	2	1,4	T-Z	Z		DN		S
8	W05ETK-SM3227L	Control of Power Electronic Converters			1			K2ETK_U13 K2ETK_K6	15	30	1	1	0,7	T	Z		DN	P	S

Altogether in semester

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for DN	Number of ECTS points for BU
lec	cl	lab	pr	sem					
3	1	1	12	3	300	890	30	28	21

2. Set of examinations in semestral arrangement

Course code	Names of courses ending with examination	Semester
W05ETK-SM1332W	Circuits and Systems	1
W05ETK-SM2131W	Power Systems Faults	1
W05ETK-SM3225W	Dynamics and Control of AC and DC Drives	1
W05ETK-SM2331W	Renewable Energy Sources	2
W05ETK-SM2334W	Energy Storage Systems	2
W05ETK-SM2536W	Integration of Distributed Resources in Power Systems	2
W05ETK-SM1337W	Photovoltaic Cells	3
one exam from optional courses block A		4

3. Numbers of allowable deficit of ECTS points after particular semesters

Semester	Allowable deficit of ECTS points after semester
1	5
2	5
3	5
4	0

Opinion of student government legislative body

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Date

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Name and surname, signature of student representative

.....
Date

.....
Dean's signature

BU – number of ECTS points assigned to hours of classes requiring direct participation of academic teachers and other persons conducting classes

Traditional – enter T, remote – enter Z

Exam – enter E, crediting – enter Z. For the group of courses – after the letter E or Z - enter in brackets the final course form (lec, cl, lab, pr, sem)

University-wide course /group of courses – enter O

DN - number of ECTS points assigned to the classes related to the University's academic activity in the discipline/disciplines to which the main field of study is assigned

Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses

KO – general education courses, PD – basic sciences courses, K – main field of study courses, S – specialization courses