

PLAN OF STUDIES

FACULTY:	Electrical Engineering
MAIN FIELD OF STUDY:	Electrical Engineering
EDUCATION LEVEL:	2nd level, 2nd level studies
FORM OF STUDIES:	full-time
PROFILE:	general academic
SPECIALIZATION:	Renewable Energy Systems
LANGUAGE OF STUDY:	english

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

Semester 1

Obligatory courses

number of ECTS points: 26

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR031330W	Numerical and Optimization Methods	1					K2ETK_W02	15	60	2	1,4	T	Z			PD	OB
2	ELR031330L	Numerical and Optimization Methods			1			K2ETK_U02 S2RES_K01	15	30	1	0,7	T	Z		P	PD	OB
3	ELR031331W	Power Quality Assessment	2					S2RES_W13 K2ETK_K01 K2ETK_K02	30	60	2	1,4	T	Z			S	OB
4	ELR031331L	Power Quality Assessment			1			S2RES_U11 S2RES_U13 K2ETK_K01 K2ETK_K02	15	30	1	0,7	T	Z		P	S	OB
5	ELR032131W	Power Systems Faults	2					K2ETK_W03 K2ETK_K01	30	120	4	2,8	T	E			K	OB
6	ELR032139P	Fault Calculations				2		K2ETK_U02 S2RES_U14 K2ETK_K02	30	60	2	1,4	T	Z		P	S	OB
7	ELR033225W	Dynamics and Control of AC and DC Drives	2					K2ETK_W04	30	120	4	2,8	T	E			K	OB
8	ELR033225L	Dynamics and Control of AC and DC Drives			1			K2ETK_U03 K2ETK_K02 S2RES_K01	15	30	1	0,7	T	Z		P	K	OB
9	ELR033225P	Dynamics and Control of AC and DC Drives				1		K2ETK_U03 K2ETK_K02 S2RES_K01	15	30	1	0,7	T	Z		P	K	OB
10	ELR033228W	Power Electronics	2					S2RES_W01 S2RES_K02	30	90	3	2,1	T	Z			S	OB
11	ELR033228L	Power Electronics			1			S2RES_U01 S2RES_K02	15	30	1	0,7	T	Z		P	S	OB
12	ESN001501W	Advanced Technology in Electrical Power Generation	2					S2RES_W05 S2RES_W14	30	90	3	2,1	T	Z			S	OB
13	ESN001501C	Advanced Technology in Electrical Power Generation		1				K2ETK_K03 S2RES_U05 S2RES_U15	15	30	1	0,7	T	Z		P	S	OB
Total			11	1	4	3			285	780	26	18,2						

Optional courses					minimum	75	hours in semester,				4	ECTS points						
No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
Optional courses block: Foreign Language								ECTS		3		hours		4				
1	JZL100709BKC	Foreign language B2+ or C1+		1				K2ETK_U05 K2ETK_K01	15	30	1	0,7	T	Z	O	P	KO	W
2	JZL100710BKC	Foreign language A1 or A2		3				K2ETK_U06 K2ETK_K04	45	60	2	1,4	T	Z	O	P	KO	W
Optional courses block: Sports								ECTS		1		hours		1				
1	WFW010000BKC	Sporting classes		1				K2ETK_K06	15	15	1	0,7	T	Z	O	P	KO	W

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
lec	cl	lab	pr	sem				
11	6	4	3	0	360	885	30	21

Semester 2

Obligatory courses

number of ECTS points: 24

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR031332W	Circuits and Systems	2					K2ETK_W01	30	60	2	1,4	T	E			K	OB
2	ELR031332C	Circuits and Systems		1				K2ETK_K01 K2ETK_U01	15	30	1	0,7	T	Z		P	K	OB
3	ELR032133W	Simulation and Analysis of Power System Transients	1					S2RES_W02 S2RES_W05 S2RES_W08	15	30	1	0,7	T	Z			S	OB
4	ELR032133L	Simulation and Analysis of Power System Transients			2			S2RES_U02 S2RES_U14 S2RES_K01 S2RES_K02	30	60	2	1,4	T	Z		P	S	OB
5	ELR032137W	Protection and Control of Distributed Energy Sources	1					K2ETK_W03 S2RES_W02	15	60	2	1,4	T	E			S	OB
6	ELR032137L	Protection and Control of Distributed Energy Sources			1			K2ETK_U01 S2RES_U02 S2RES_U14 K2ETK_K01 S2RES_K01	15	30	1	0,7	T	Z		P	S	OB
7	ELR032137S	Protection and Control of Distributed Energy Sources					1	K2ETK_U07 S2RES_U07	15	30	1	0,7	T	Z		P	S	OB
8	ELR032331W	Renewable Energy Sources	2					S2RES_W05 S2RES_K01	30	60	2	1,4	T	Z			S	OB
9	ELR032331S	Renewable Energy Sources					1	S2RES_U05 S2RES_K01	15	30	1	0,7	T	Z		P	S	OB
10	ELR032332W	Water Power Plants	2					S2RES_W04	30	60	2	1,4	T	Z			S	OB
11	ELR032332S	Water Power Plants					1	S2RES_U04 S2RES_K02	15	30	1	0,7	T	Z		P	S	OB
12	ELR032536W	Integration of Distributed Resources in Power Systems	2					S2RES_W04 S2RES_W05 S2RES_W06 S2RES_K01	30	60	2	1,4	T	E			S	OB
13	ELR032536L	Integration of Distributed Resources in Power Systems			1			S2RES_U02 S2RES_U04 S2RES_U06 S2RES_U05 S2RES_K01	15	30	1	0,7	T	Z		P	S	OB
14	ELR033229W	Electromechanical Systems in Renewable Energy	1					S2RES_W07	15	30	1	0,7	T	Z			S	OB
15	ELR033229S	Electromechanical Systems in Renewable Energy					1	S2RES_U07 K2ETK_K01	15	30	1	0,7	T	Z		P	S	OB
16	ELR033313W	Analog and Digital Measurement Systems	2					K2ETK_W05	30	60	2	1,4	T	Z			PD	OB
17	ELR033313L	Analog and Digital Measurement Systems			1			K2ETK_U04 S2RES_K02	15	30	1	0,7	T	Z		P	PD	OB
Total			13	1	5		4		345	720	24	16,8						

Optional courses			minimum					175	hours in semester,				6	ECTS points				
No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR035105Q	Diploma placement 4 weeks				40		S2RES_U18 S2RES_K01	160	120	4	2,8	T	Z		P	S	W
Optional courses block: Management								ECTS		2		hours		1				
1	ZMR032538W	Market Mechanisms in Power Systems with Distributed Energy	1					K2ETK_W06 K2ETK_K03 K2ETK_K07	15	60	2	1,4	T	Z	O		KO	W
2	ZMZ001499W	Fundamentals of Management	1					K2ETK_W06 K2ETK_K03 K2ETK_K07	15	60	2	1,4	T	Z	O		KO	W

Altogether in semester

Diploma placement

Total number of hours					Total number of ZZU hours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points
lec	cl	lab	pr	sem				
14	1	5	0	4	360	780	26	18,2
0	0	0	40	0	160	120	4	2,8

Semester 3

Obligatory courses

number of ECTS points: 21

No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR031337W	Photovoltaic Cells	2					S2RES_K01 S2RES_W08	30	90	3	2,1	T	E			S	OB
2	ELR031337L	Photovoltaic Cells			1			S2RES_K01 S2RES_U08	15	30	1	0,7	T	Z		P	S	OB
3	ELR031338W	Industrial ecology - selected problems	1					S2RES_W09 K2ETK_K03	15	30	1	0,7	T	Z			S	OB
4	ELR031338S	Industrial ecology - selected problems					1	K2ETK_K03 S2RES_U09	15	30	1	0,7	T	Z		P	S	OB
5	ELR032135W	Artificial Intelligence Techniques	2					K2ETK_W02	30	60	2	1,4	T	Z			S	OB
6	ELR032135P	Artificial Intelligence Techniques				1		K2ETK_U02 K2ETK_K02	15	30	1	0,7	T	Z		P	S	OB
7	ELR032334W	Energy Storage Systems	1					S2RES_W03	15	60	2	1,4	T	E			S	OB
8	ELR032334P	Energy Storage Systems				1		S2RES_U03 S2RES_K02	15	30	1	0,7	T	Z		P	S	OB
9	ELR032537W	Legal Regulations and Investments in Power Systems with Distributed Energy Sources	2					S2RES_W12 S2RES_K01	30	60	2	1,4	T	Z			S	OB
10	ELR032537S	Legal Regulations and Investments in Power Systems with Distributed Energy Sources					1	S2RES_U12 S2RES_K01	15	30	1	0,7	T	Z		P	S	OB
11	ELR033110W	Modelling of Electrical Machines	1					S2RES_W10	15	30	1	0,7	T	Z			S	OB
12	ELR033110P	Modelling of Electrical Machines				2		S2RES_U10 K2ETK_K07	30	60	2	1,4	T	Z		P	S	OB
13	ELR033311W	Electromagnetic Compatibility	2					S2RES_W11 S2RES_K02	30	60	2	1,4	T	Z			S	OB
14	ELR033311L	Electromagnetic Compatibility			1			S2RES_U11 S2RES_K02	15	30	1	0,7	T	Z		P	S	OB
Total			11		2	4	2		285	630	21	14,7						

Optional courses			minimum					135				hours in semester,		9		ECTS points			
No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course				
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type	
1	ELR035117P ELR035127P ELR035137P	Diploma Project				8		S2RES_U19 K2ETK_K07	120	240	8	5,6	T	Z		P	S	W	
Optional courses block: Law								ECTS		1		hours		1					
1	PRR031231W	Intellectual property rights in the world	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	T	Z	O		KO	W	
2	PRR031232W	Inventions and patents	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	T	Z	O		KO	W	
3	PRR031233W	Industrial property and copyright for engineers	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	T	Z	O		KO	W	
4	PRZ001007W	Protection of Intellectual Property	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	T	Z	O		KO	W	
5	PRZ001008W	International Law	1					K2ETK_W07 K2ETK_K03 K2ETK_K05	15	30	1	0,7	T	Z	O		KO	W	

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
lec	cl	lab	pr	sem				
12	0	2	12	2	420	900	30	21

Semester 4

Optional courses			minimum					300	hours in semester,				30	ECTS points				
No.	Course code	Name of course	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form of course	Way of crediting	Course			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes			university-wide	practical	kind	type
1	ELR035108S	Diploma seminar					2	S2RES_U20 S2RES_K01	30	90	3	2,1	T	Z		P	S	W
2	ELR035119DP ELR035129DP ELR035139DP	Master's thesis					12	S2RES_U21 K2ETK_K04 S2RES_K01	180	540	18	12,6	T	Z		P	S	W
Optional courses block: Social Sciences and Ethics								ECTS		2		hours		1				
1	FLH051721S	Ethics in bussiness					1	K2ETK_U07 K2ETK_K07	15	60	2	1,4	T	Z	O	P	KO	W
2	PKH053721S	The art of public speaking					1	K2ETK_U07 K2ETK_K07	15	60	2	1,4	T	Z	O	P	KO	W
3	PKH053821S	Social communication					1	K2ETK_U07 K2ETK_K07	15	60	2	1,4	T	Z	O	P	KO	W
Optional courses block: A								ECTS		4		hours		3				
1	ELR031230W	Visual Engineering Environments and Graphical Languages	1					S2RES_W15	15	30	1	0,7	T	E			S	W
2	ELR031230L	Visual Engineering Environments and Graphical Languages			2			S2RES_U16 K2ETK_K02	30	90	3	2,1	T	Z		P	S	W
3	ELR031334W	Signal and Systems	2					K2ETK_W01 S2RES_W15	30	90	3	2,1	T	E			S	W
4	ELR031334C	Signal and Systems		1				K2ETK_U01 S2RES_U16 K2ETK_W01 K2ETK_K01	15	30	1	0,7	T	Z		P	S	W
5	ELR031335W	Advanced Signal Processing Methods	2					S2RES_W15	30	90	3	2,1	T	E			S	W
6	ELR031335C	Advanced Signal Processing Methods		1				S2RES_K01 S2RES_U16	15	30	1	0,7	T	Z		P	S	W
7	ELR032234W	PLC and Wireless Communications for Monitoring and Metering	2					S2RES_W15 S2RES_K01	30	90	3	2,1	T	E			S	W
8	ELR032234S	PLC and Wireless Communications for Monitoring and Metering					1	S2RES_U16 S2RES_K01	15	30	1	0,7	T	Z		P	S	W
9	ELR032335W	Advanced Substations and Electrical Equipment	2					S2RES_W15	30	90	3	2,1	T	E			S	W
10	ELR032335P	Advanced Substations and Electrical Equipment					1	S2RES_K01 S2RES_U16	15	30	1	0,7	T	Z		P	S	W
11	ELR032534W	Power System Modelling	2					S2RES_W15	30	90	3	2,1	T	E			S	W
12	ELR032534P	Power System Modelling					1	S2RES_U16 S2RES_K01	15	30	1	0,7	T	Z		P	S	W
13	ELR032535W	Computer Control of Power System	2					S2RES_W15	30	90	3	2,1	T	E			S	W
14	ELR032535S	Computer Control of Power System					1	S2RES_K01 S2RES_U16	15	30	1	0,7	T	Z		P	S	W

Optional courses block: B										ECTS		3	hours					
1	ELR032136W	Design of logic circuits	1					S2RES_W16	15	60	2	1,4	T	Z			S	W
2	ELR032136L	Design of logic circuits			1			K2ETK_K01 K2ETK_K02 S2RES_K02 S2RES_U17	15	30	1	0,7	T	Z		P	S	W
3	ELR032138W	Digital Control Systems	1					S2RES_W16 S2RES_K01 S2RES_K02	15	60	2	1,4	T	Z			S	W
4	ELR032138L	Digital Control Systems			1			S2RES_U17 S2RES_K01 S2RES_K02	15	30	1	0,7	T	Z		P	S	W
5	ELR033226W	Fuzzy Logic Control	1					S2RES_W16	15	60	2	1,4	T	Z			S	W
6	ELR033226L	Fuzzy Logic Control			1			S2RES_U17 S2RES_K01	15	30	1	0,7	T	Z		P	S	W
7	ELR033227W	Control of Power Electronic Converters	1					S2RES_W16 S2RES_K01	15	60	2	1,4	T	Z			S	W
8	ELR033227L	Control of Power Electronic Converters			1			S2RES_U17 S2RES_K01	15	30	1	0,7	T	Z		P	S	W

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
lec	cl	lab	pr	sem				
3	1	1	12	3	300	900	30	21

2. Set of examinations in semestral arrangement

Course code	Names of courses ending with examination	Semester
ELR032131W	Power Systems Faults	1
ELR033225W	Dynamics and Control of AC and DC Drives	1
ELR031332W	Circuits and Systems	2
ELR032137W	Protection and Control of Distributed Energy Sources	2
ELR032536W	Integration of Distributed Resources in Power Systems	2
ELR031337W	Photovoltaic Cells	3
ELR032334W	Energy Storage Systems	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	4
2	4
3	3
4	0

Opinion of student government legislative body

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Date

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Name and surname, signature of student representative

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Date

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Dean's signature