FACULTY OF MECHANICAL AND POWER ENGINEERING

***main field of study*: POWER ENGINEERING**

full-time studies 2nd level

PLANS of STUDIES

Edited adjustment_April 2014

Attachment no. 1 to Programme of Studies

PLAN OF STUDY

FACULTY: MECHANICAL AND POWER ENGINEERING

MAIN FIELD OF STUDY: POWER ENGINEERING

EDUCATION LEVEL: 2nd level, magister inżynier

FORM OF STUDIES: full-time

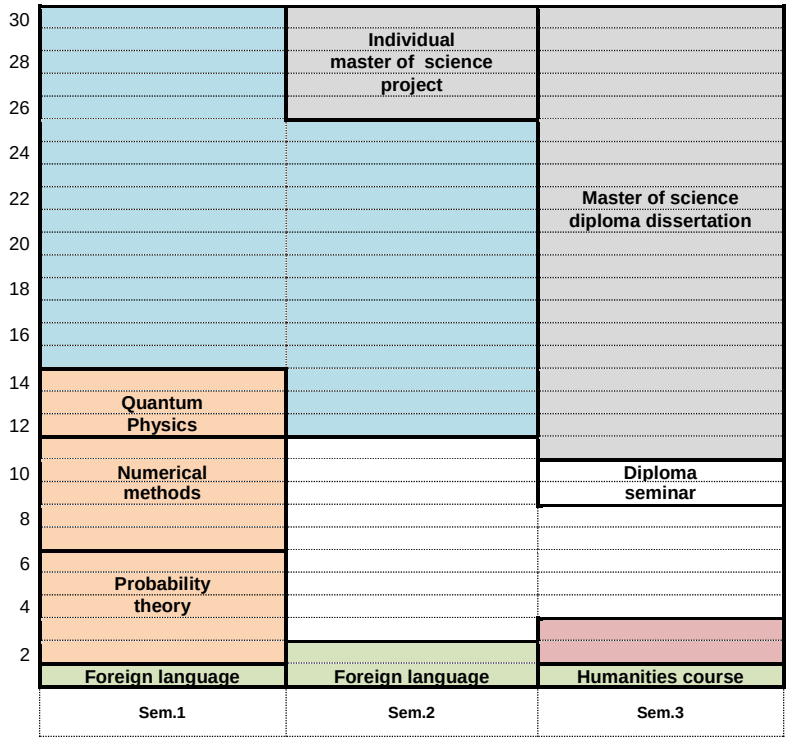
PROFILE: general academic

SPECIALIZATION: **REFRIGERATING, HEATING AND AIR-CONDITIONING**

LANGUAGE OF STUDY: polish

Faculty Council Resolution of 26.09.2012
In effect since 01.10.2012

Plan of studies structure in point layout



Legend

Basic and obligatory courses
General and obligatory courses
General and optional courses
Fielf-of-studies and obligatory courses
Fielf-of-studies and optional courses
Specialization and optional courses

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

Semester 1

Obligatory courses number of ECTS points 13

No.	Course/ group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course /group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			lab	pr	sem	type[7]
1	ESN0200	Quantum Physics	2					K2ENG_W03	30	90	3	1,5	T	E			PD	Ob
2	ESN0910	Probability Theory	2					K2ENG_W01	30	90	3	1,5	T	E			PD	Ob
3	ESN0910	Probability Theory		1				K2ENG_U05	15	60	2	1,5	T	Z		P	PD	Ob
4	ESN0502	Numerical Methods	2					K2ENG_W02	30	90	3	1,5	T	E			PD	Ob
5	ESN0502	Numerical Methods			2			K2ENG_U06	30	60	2	1,5	T	Z		P	PD	Ob
		Total	6	1	2				135	390	13	7,5						

Optional courses (minimum 255 hours in semester, 17 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course /group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			lab	pr	sem	type[7]
1	JZL100655BK	Foreign Language (continuation), level B+		1				K2ENG_U04	15	30	1	0,75	T	Z	O	P	KO	W
2	ESN0241	Heat management	1					S2CCK_W02	15	30	1	0,5	T	Z			S	W
3	ESN0241	Heat management		1				S2CCK_U02	15	30	1	0,75	T	Z		P	S	W
4	ESN1152	Thermodynamic basis of heating engineering	2					S2CCK_W10	30	60	2	1	T	Z			S	W
5	ESN1073	Refrigerating systems	2					S2CCK_W01	30	60	2	1	T	Z			S	W
6	ESN1073	Refrigerating systems		1				S2CCK_U08	15	30	1	0,75	T	Z		P	S	W
7	ESN1073	Refrigerating systems			2			S2CCK_U01	30	60	2	1,5	T	Z		P	S	W
8	ESN1024	Sorption energetic systems	2					S2CCK_W06	30	60	2	1	T	Z			S	W
9	ESN1024	Sorption energetic systems		1				S2CCK_U03	15	30	1	0,75	T	Z		P	S	W
10	ESN1024	Sorption energetic systems				1		S2CCK_U07	15	30	1	0,75	T	Z		P	S	W
11	ESN0557	Heat carriers and accumulators	1					S2CCK_W11	15	30	1	0,5	T	Z			S	W
12	ESN0303	Pollutants emission control	1					S2CCK_W04	15	30	1	0,5	T	Z			S	W
13	ESN0303	Pollutants emission control			1			S2CCK_U05 K2ENG_K03	15	30	1	0,75	T	Z		P	S	W
		Total	9	4	3	1			255	510	17	10,5						

[1]BK – number of ECTS points assigned to hours of classes requiring direct contact of teachers with students

[2]Traditional – enter T, remote – enter Z
[3]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)
[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
15	5	5	1		390	900	30	18

Semester 2

Obligatory courses number of ECTS points 9

No.	Course/ group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course /group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			lab	pr	sem	type[7]
1	ESN0550	Mathematical modelling of energy generation installations	2					K2ENG_W05	30	60	2	1	T	E			K	Ob
2	ESN0550	Mathematical modelling of energy generation installations			4			K2ENG_U07	60	120	4	3	T	Z		P	K	Ob
3	ESN1115	New Generation Energy Technologies	2					K2ENG_W04	30	90	3	1,5	T	E			K	Ob
		Total	4		4				120	370	9	5,5						

Optional courses (minimum 315 hours in semester, 21 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course /group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			lab	pr	sem	type[7]
1	JZL100655BK	Foreign Language (second), any level		3				K2ENG_U09	45	60	2	1,5	T	Z	O	P	KO	W
2	ESN0251	Installations for environment protection - optimalization and exploitation	1					S2CCK_W08	15	30	1	0,5	T	Z			S	W
3	ESN0251	Installations for environment protection - optimalization and exploitation					1	S2CCK_U09 K2ENG_K01 K2ENG_K02 K2ENG_K03	15	30	1	0,75	T	Z		P	S	W
4	ESN1074	Power Systems Based on Renewable and	1					S2CCK_W09	15	30	1	0,5	T	Z			S	W

		Waste Energy																
5	ESN1074	Power Systems Based on Renewable and Waste Energy		1				S2CCK_U06	15	30	1	0,75	T	Z		P	S	W
6	ESN1245	Ventilation and air-conditioning	2					S2CCK_W07	30	60	2	1	T	Z			S	W
7	ESN1245	Ventilation and air-conditioning		1				S2CCK_U11	15	30	1	0,75	T	Z		P		W
8	ESN0275	Heating and air-condition installation	1					S2CCK_W03	15	30	1	0,5	T	Z			S	W
9	ESN0275	Heating and air-condition installation					1	S2CCK_U04	15	30	1	0,75	T	Z		P	S	W
10	ESN0277	Cryogenic installations	2					S2CCK_W12	30	60	2	1	T	Z			S	W
11	ESN0277	Cryogenic installations				1		S2CCK_U12	15	30	1	0,75	T	Z		P	S	W
12	ESN0822	Heat pumps and heat transformers	1					S2CCK_W05 K2ENG_K02	15	30	1	0,5	T	Z			S	W
13	ESN0822	Heat pumps and heat transformers				1		S2CCK_U10	15	30	1	0,75	T	Z		P	S	W
14	ESN1362	Individual master of science project				4		K2ENG_U01 K2ENG_U03 K2ENG_K04 K2ENG_K05	60	150	5	2	T	Z		P	K	W
		Total	8	5		6	2		315	630	21	12						

[2]Traditional – enter T, remote – enter Z
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[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
12	5	4	6	2	435	900	30	17,5

Semester 3

Obligatory courses number of ECTS points 9

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course /group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			lab	pr	sem	type[7]
1	ESN1062	Energy systems	2					K2ENG_W08	30	60	2	1	T	Z			K	Ob
2	ESN1062	Energy systems		1				K2ENG_U08	15	30	1	0,75	T	Z		P	K	Ob
3	ESN1300	Environmental management	2					K2ENG_W06 K2ENG_K02	30	60	2	1	T	Z			K	Ob
4	ESN1380	Diploma seminar					2	K2ENG_U01	30	60	2	1,5	T	Z		P	K	Ob

								K2ENG_U02 K2ENG_K01 K2ENG_K03 K2ENG_K04 K2ENG_K05										
5	ESN0365	Marketing and Management	2					K2ENG_W07	30	60	2	1	T	Z			KO	Ob
		Total	6	1			2		135	270	9	5,25						

Optional courses (minimum 15 hours in semester, 21 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course /group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			lab	pr	sem	type[7]
1	HMH100035BK	Humanities Course	1					K2ENG_W07 K2ENG_K02	15	30	1	0,5	T	Z	O		KO	W
2	ESN1430	Master of science diploma dissertation						K2ENG_U01 K2ENG_U02 K2ENG_U03 K2ENG_K01 K2ENG_K04 K2ENG_K05		600	20	4	T	Z		P		W
		Total	1						15	630	21	4,5						

[2]Traditional – enter T, remote – enter Z
[3]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)
[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
7	1			2	150	900	30	9.75

2. Set of examinations in semestral arrangement

Course code	Names of courses ending with examination	Semester
ESN0910 ESN0502 ESN0200	1. Probability Theory 2. Numerical Methods 3. Quantum Physics	1
ESN1115 ESN0550	1. New Generation Energy Technologies 2. Mathematical modelling of energy generation installations	2

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

Semester	Allowable deficit of ECTS points after semester
1	10
2	0

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FACULTY: MECHANICAL AND POWER ENGINEERING

MAIN FIELD OF STUDY: POWER ENGINEERING

EDUCATION LEVEL: 2nd level, magister inżynier

FORM OF STUDIES: full-time

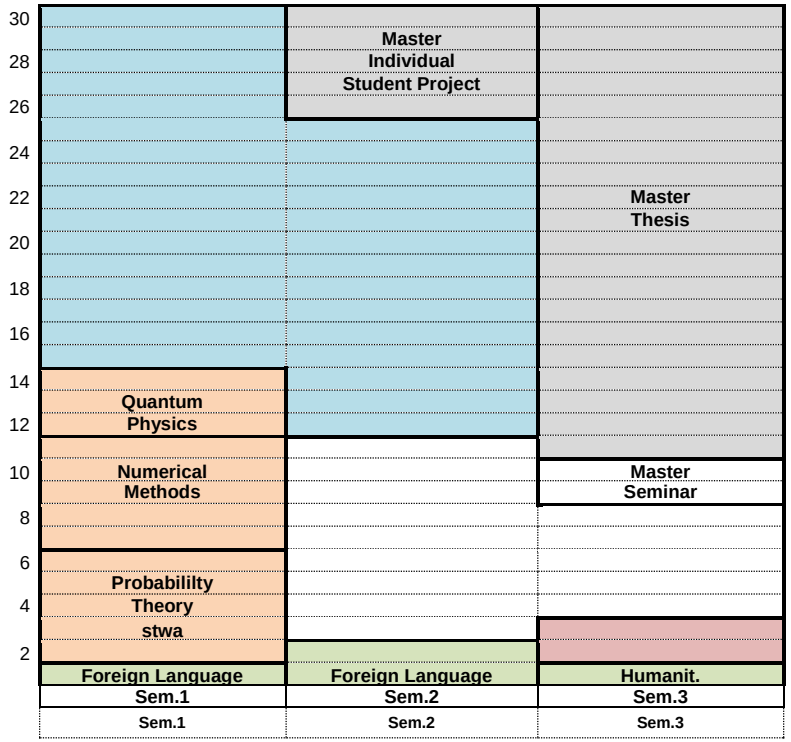
PROFILE: general academic

SPECIALIZATION: POWER ENGINEERING AND AIR PROTECTION

LANGUAGE OF STUDY: Polish

Faculty Council Resolution of 26.09.2012
In effect since 01.10.2012

Plan of studies structure in point layout



Legend

Basic and obligatory courses
General and obligatory courses
General optional courses
Fielf-of-studies and obligatory courses
Fielf-of-studies and optional courses
Specialization and optional courses

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

Semester 1

Obligatory courses number of ECTS points 13

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of credi-ting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN0910	Probability theory	2					K2ENG_W01	30	90	3	1,5	T	E			PD	Ob
2	ESN0910	Probability theory		1				K2ENG_U05	15	60	2	1,5	T	Z		P	PD	Ob
3	ESN0502	Numerical methods	2					K2ENG_W02	30	90	3	1,5	T	E			PD	Ob
4	ESN0502	Numerical methods			2			K2ENG_U06	30	60	2	1,5	T	Z		P	PD	Ob
5	ESN0200	Quantum Physics	2					K2ENG_W03	30	90	3	1,5	T	E			PD	Ob
		Total	6	1	2				135	390	13	7,5						

Optional courses (minimum 17 hours in semester, 17 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of credi-ting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	JZL100655BK	Foreign Language (continuation), level B2+		1				K2ENG_U04	15	30	1	0,75	T	Z	O	P	KO	W
2	ESN0560	Gas dedusting	2					S2ENA_W01	30	60	2	1	T	Z			S	W
3	ESN0560	Gas dedusting				2		S2ENA_U01	30	60	2	1,5	T	Z		P	S	W
4	ESN0920	Reduction of pollution removal	2					S2ENA_W02	30	60	2	1	T	Z			S	W
5	ESN0920	Reduction of pollution removal		2				S2ENA_U02 K2ENG_K02 K2ENG_K04 K2ENG_K05	30	60	2	1,5	T	Z		P	S	W
6	ESN0022	Control Systems in Power Engineering	1					S2ENA_W03	15	30	1	0,5	T	Z			S	W
7	ESN0022	Control Systems in Power Engineering				1		S2ENA_U03	15	30	1	0,75	T	Z		P	S	W
8	ESN1140	Coal Combustion Technologies	2					S2ENA_W04	30	60	2	1	T	Z			S	W
9	ESN1140	Coal Combustion Technologies		1				S2ENA_U04	15	30	1	0,75	T	Z		P	S	W
10	ESN0570	Fuel cell and technology of hydrogen Production	2					S2ENA_W05	30	60	2	1	T	Z			S	W
11	ESN0570	Fuel cell and technology of hydrogen Production			1			S2ENA_U05	15	30	1	0,75	T	Z		P	S	W
		Total	9	4	1	3			255	510	17	10,5						

[2]Traditional – enter T, remote – enter Z

[3]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)

[4]University-wide course /group of courses – enter O

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

[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization, [7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
15	5	3	3		390	900	30	18

Semester 2

Obligatory courses number of ECTS points 9

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of credi-ting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN1115	New Generation Energy Technologies	2					K2ENG_W04	30	90	3	1,5	T	E			K	Ob
2	ESN0550	Mathematical modelling of energy generation installations	2					K2ENG_W05	30	60	2	1	T	E			K	Ob
3	ESN0550	Mathematical modelling of energy generation installations			4			K2ENG_U07	60	120	4	3	T	Z		P	K	Ob
		Total	4		4				120	270	9	5,5						

Optional courses (minimum 21 hours in semester, 21 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of credi-ting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	JZL100655BK	Foreign Language (second), any level		3				K2ENG_U09	45	60	2	1,5	T	Z	O	P	KO	W
2	ESN0540	Measurements of gas pollutants	1					S2ENA_W06	15	30	1	0,5	T	Z			S	W
3	ESN0540	Measurements of gas pollutants			2			S2ENA_U06	30	60	2	1,5	T	Z		P	S	W
4	ESN0530	Metrology in dust engineering	1					S2ENA_W07	15	30	1	0,5	T	Z			S	W
5	ESN0530	Metrology in dust engineering			2			S2ENA_U07 K2ENG_K01 K2ENG_K03	30	60	2	1,5	T	Z		P	S	W
6	ESN0590	Low Emission Furnaces	1					S2ENA_W08	15	30	1	0,5	T	Z			S	W
7	ESN0590	Low Emission Furnaces			1			S2ENA_U08	15	30	1	0,75	T	Z		P	S	W
8	ESN1310	Fuels Gasification	2					S2ENA_W09	30	60	2	1	T	Z			S	W
9	ESN1310	Fuels Gasification		1				S2ENA_U09	15	30	1	0,75	T	Z		P	S	W
10	ESN0145	Energy Use of Biofuels	2					S2ENA_W10	30	60	2	1	T	Z			S	W
11	ESN0145	Energy Use of Biofuels		1				S2ENA_U10	15	30	1	0,75	T	Z		P	S	W

12	ESN1362	Master Individual Student Project				4		K2ENG_U01 K2ENG_U03 K2ENG_K04 K2ENG_K05	60	150	5	2	T	Z		P	K	W
	Total		7	5	5	4			315	630	21	12,25						

[2]Traditional – enter T, remote – enter Z
[3]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)
[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
11	5	9	4		435	900	30	17,75

Semester 3

Obligatory courses number of ECTS 9

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of credi-ting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN0365	Marketing and Management	2					K2ENG_W06	30	60	2	1	T	Z			KO	Ob
2	ESN1300	Environmental management	2					K2ENG_W06 K2ENG_K02	30	60	2	1	T	Z			K	Ob
3	ESN1062	Energy systems	2					K2ENG_W08	30	60	2	1	T	Z			K	Ob
4	ESN1062	Energy systems		1				K2ENG_U08	15	30	1	0,75	T	Z		P	K	Ob
5	ESN1380	Master Seminar					2	K2ENG_U01 K2ENG_U02 K2ENG_K01 K2ENG_K03 K2ENG_K04 K2ENG_K05	30	60	2	1,5	T	Z		P	K	Ob
		Total	6	1			2		135	270	9	5,25						

Optional courses (minimum 15 hours in semester, 21 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of credi-ting	Course/group of courses			
			lec	cl	lab	pr	se m		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	HSN100200BK	Humanities Course	1					K2ENG_W07 K2ENG_K02	15	30	1	0,5	T	Z	O		KO	W
2	ESN1430	Master Thesis						K2ENG_U01 K2ENG_U02 K2ENG_U03 K2ENG_K01 K2ENG_K04 K2ENG_K05		600	20	4	T	Z		P	K	W
		Total	1						15	630	21	4,5						

[2]Traditional – enter T, remote – enter Z
[3]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)
[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

Altogether in semester

Total number of hours					Total number of ZZUhours	Total number of CNPS hours	Total number of ECTS points	Number of ECTS points for BK classes[1]
lec	cl	lab	pr	sem				
7	1			2	150	900	30	9,75

2. Set of examinations in semestral arrangement

Course code	Names of courses ending with examination	Semester
ESN0910 ESN0502 ESN0200	1. Probability Theory 2. Numerical Methods 3. Quantum Physics	1
ESN1115 ESN0550	1. Mathematical Modelling of Energy Generation Installations 2. New Generation Energy Technologies	2

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

Semester	Allowable deficit of ECTS points after semester
1	10
2	0

Attachment no. 1 to Programme of Studies

PLAN OF STUDIES

FACULTY: **MECHANICAL AND POWER ENGINEERING**

MAIN FIELD OF STUDY: POWER ENGINEERING

EDUCATION LEVEL: 2nd level, magister inżynier

FORM OF STUDIES: full-time

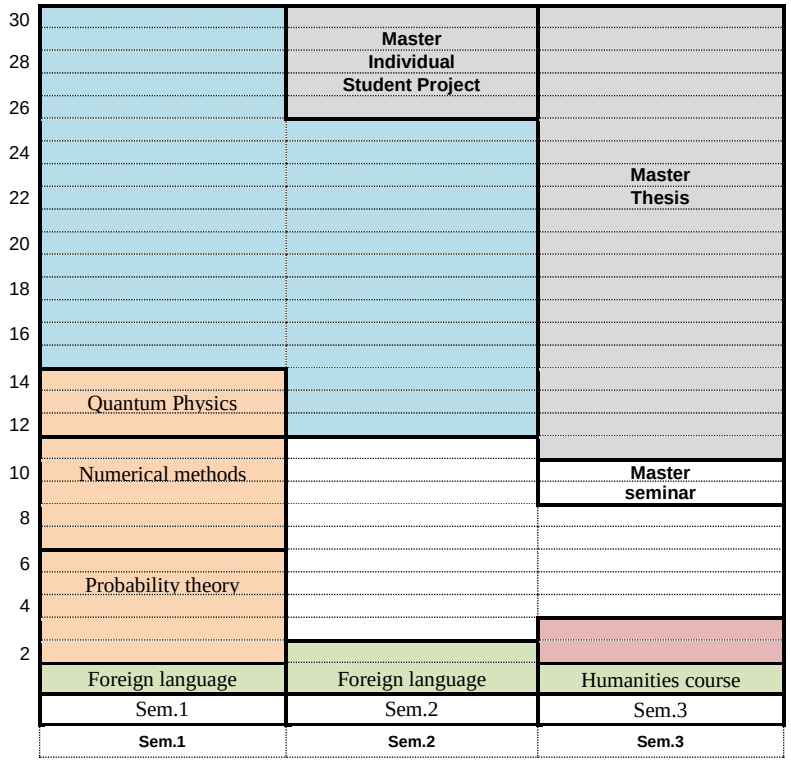
PROFILE: general academic

SPECIALIZATION: **NUCLEAR POWER ENGINEERING**

LANGUAGE OF STUDY: polish

Faculty Council Resolution of 26.09.2012
In effect since 01.10.2012

Plan of studies structure in point layout



Legenda

Basic and obligatory courses
General and obligatory courses
General and optional courses
Fielf-of-studies and obligatory courses
Fielf-of-studies and optional courses
Specialization and optional courses

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

Semester 1

Obligatory courses number of ECTS points 13

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN0910	Probability theory	2					K2ENG_W01	30	90	3	1,5	T	E			PD	Ob
2	ESN0910	Probability theory		1				K2ENG_U05	15	60	2	1,5	T	Z		P	PD	Ob
3	ESN0502	Numerical methods	2					K2ENG_W02	30	90	3	1,5	T	E			PD	Ob
4	ESN0502	Numerical methods			2			K2ENG_U06	30	60	2	1,5	T	Z		P	PD	Ob
5	ESN0200	Quantum Physics	2					K2ENG_W03	30	90	3	1,5	T	E			PD	Ob
		Total	6	1	2				**135**	390	13	7,5						

Optional courses (minimum 255 hours in semester, 17 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	JZL100655BK	Foreign language (continuation), B2+ level		1				K2ENG_U04	15	30	1	0,75	T	Z	O	P	KO	W
2	ESN0878	Heat transfer and mass flow in nuclear reactors	2					S2ENJ_W01	30	60	2	1	T	Z			S	W
3	ESN0878	Heat transfer and mass flow in nuclear reactors		1				S2ENJ_U01	15	30	1	0,75	T	Z		P	S	W
4	ESN0206	Nuclear physics and reactor theory	2					S2ENJ_W02	30	60	2	1	T	Z			S	W
5	ESN0206	Nuclear physics and reactor theory		1				S2ENJ_U02	15	30	1	0,75	T	Z		P	S	W
6	ESN0167	Thermonuclear power generation	2					S2ENJ_W03	30	60	2	1	T	Z			S	W
7	ESN0167	Thermonuclear power generation		1				S2ENJ_U03	15	30	1	0,75	T	Z		P	S	W
8	ESN0915	Radioisotopes and ionizing radiation protection	2					S2ENJ_W08	30	60	2	1	T	Z			S	W
9	ESN0915	Radioisotopes and ionizing radiation protection			2			S2ENJ_U07	30	60	2	1,5	T	Z		P	S	W
10	ESN0102	Nuclear fuel cycle	2					S2ENJ_W05	30	60	2	1	T	Z			S	W
11	ESN0102	Nuclear fuel cycle		1				S2ENJ_U05	15	30	1	0,75	T	Z		P	S	W
		Total	10	5	2				255	510	17	10,25						

[2]Traditional – enter T, remote – enter Z
[3]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)
[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization, Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
16	6	4			390	900	30	17,75

Semester 2

Obligatory courses number of ECTS points 9

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN1115	New Generation Energy Technologies	2					K2ENG_W04	30	90	3	1,5	T	E			K	Ob
2	ESN0550	Mathematical modelling of energy generation installations	2					K2ENG_W05	30	60	2	1	T	E			K	Ob
3	ESN0550	Mathematical modelling of energy generation installations			4			K2ENG_U07	60	120	4	3	T	Z		P	K	Ob
		Total	4		4				120	270	9	5,5						

Optional courses (minimum 315 hours in semester, 21 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	JZL100655BK	Foreign language (second), any level		3				K2ENG_U09	45	60	2	1,5	T	Z	O	P	KO	W
2	ESN0922	Nuclear reactors (PWR, BWR, HWR, HTR, FBR)	3					S2ENJ_W06	45	90	3	1,5	T	Z			S	W
3	ESN0922	Nuclear reactors (PWR, BWR, HWR, HTR, FBR)			3			S2ENJ_U06	45	90	3	2,25	T	Z		P	S	W
4	ESN0415	Nuclear machinery and equipment	2					S2ENJ_W07	30	60	2	1	T	Z			S	W
5	ESN0265	Materials Engineering	2					S2ENJ_W04	30	60	2	1	T	Z			S	W
6	ESN0265	Materials Engineering			2			S2ENJ_U04	30	60	2	1,5	T	Z		P	S	W
7	ESN0045	Nuclear safety and security	1					S2ENJ_W09	15	30	1	0,5	T	Z			S	W
8	ESN0045	Nuclear safety and security					1	S2ENJ_U08	15	30	1	0,75	T	Z		P	S	W
9	ESN1362	Individual master of science project				4		K2ENG_U01 K2ENG_U03 K2ENG_K04 K2ENG_K05	60	150	5	2	T	Z		P	K	W
		Total	8	3	5	4	1		315	630	21	12						

[2]Traditional – enter T, remote – enter Z

[3]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)

[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
12	3	9	4	1	435	900	30	17,5

Semester 3

Obligatory courses number of ECTS points 9

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN0365	Marketing and Management	2					K2ENG_W06	30	60	2	1	T	Z			KO	Ob
2	ESN1300	Environmental management	2					K2ENG_W06 K2ENG_K02	30	60	2	1	T	Z			K	Ob
3	ESN1062	Energy systems	2					K2ENG_W08	30	60	2	1	T	Z			K	Ob
4	ESN1062	Energy systems		1				K2ENG_U08	15	30	1	0,75	T	Z		P	K	Ob
5	ESN1380	Diploma seminar					2	K2ENG_U01 K2ENG_U02 K2ENG_K01 K2ENG_K03 K2ENG_K04 K2ENG_K05	30	60	2	1,5	T	Z		P	K	Ob
		Total	6	1			2		135	270	9	5,25						

Optional courses (minimum 15 hours in semester, 21 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/ group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	HSN100200BK	Humanities course	1					K2ENG_W06 K2ENG_K02	15	30	1	0,5	T	Z	O		KO	W

2	ESN1430	Master of science diploma dissertation						K2ENG_U01 K2ENG_U02 K2ENG_U03 K2ENG_K01 K2ENG_K04 K2ENG_K05		600	20	4	T	Z		P	K	W
		Total	1						15	630	21	4,5						

[2]Traditional – enter T, remote – enter Z
[3]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)
[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
7	1			2	150	900	30	9,75

2. Set of examinations in semestral arrangement

Course code	Names of courses ending with examination	Semester
ESN0910 ESN0502 ESN0200	1. Probability theory 2. Numerical methods 3. Quantum Physics	1
ESN1115 ESN0550	1. New Generation Energy Technologies 2. Mathematical modelling of energy generation installations	2

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

Semester	Allowable deficit of ECTS points after semester
1	10
2	0

Attachment no.1 to Programme of Studies

PLAN OF STUDIES

FACULTY: MECHANICAL AND POWER ENGINEERING

MAIN FIELD OF STUDY: POWER ENGINEERING

EDUCATION LEVEL: 2nd level,magister inżynier

FORM OF STUDIES: full-time

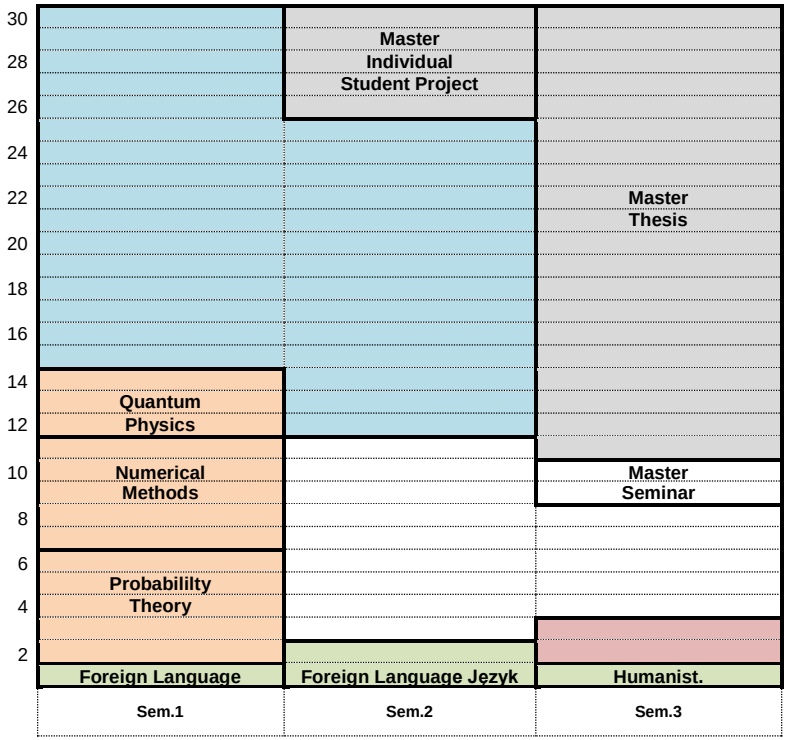
PROFILE: general academic

SPECIALIZATION: **RENEWABLE SOURCES OF ENERGY**

LANGUAGE OF STUDY: Polish

Faculty Council Resolution of 26.09.2012
In effect since 01.10.2012

Plan of studies structure in point layout



Legend

Basic obligatory courses
General education obligatory courses
General education optional courses
Advanced obligatory courses
Field of studies selectable courses
Specialization optional courses

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

Semester 1

Obligatory courses number of ECTS points 13

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN0200	Quantum physics	2					K2ENG_W03	30	90	3	1,5	T	E			PD	Ob
2	ESN0910	Probability theory	2					K2ENG_W01	30	90	3	1,5	T	E			PD	Ob
3	ESN0910	Probability theory		1				K2ENG_U05	15	60	2	1,5	T	Z		P	PD	Ob
4	ESN0502	Numerical methods	2					K2ENG_W02	30	90	3	1,5	T	E			PD	Ob
5	ESN0502	Numerical methods			2			K2ENG_U06	30	60	2	1,5	T	Z		P	PD	Ob
		Total	6	1	2				135	390	13	7,5						

Optional courses (minimum 255 hours in semester, 17 ECTS points)

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	JZL100655BK	Foreign Language (continuation). B2+ level		1				K2ENG_U04	15	30	1	0,75	T	Z	O	P	KO	W
2	ESN0193	Physics of the renewable energy	3					S2OZE_W01	45	90	3	1,5	T	Z			S	W
3	ESN0193	Physics of the renewable energy				2		S2OZE_U01	30	60	2	1,5	T	Z		P	S	W
4	ESN0193	Physics of the renewable energy					1	S2OZE_U02	15	30	1	0,75	T	Z		P	S	W
5	ESN0570	Fuel cell and technology of hydrogen production	2					S2OZE_W02	30	60	2	1	T				S	W
6	ESN0570	Fuel cell and technology of hydrogen production			1			S2OZE_U03	15	30	1	0,75	T	Z		P	S	W
7	ESN0180	Water power engineering	2					S2OZE_W03	30	60	2	1	T				S	W
8	ESN0180	Water power engineering		1				S2OZE_U04	15	30	1	0,75	T	Z		P	S	W
9	ESN0180	Water power engineering				2		S2OZE_U05	30	60	2	1,5	T	Z		P	S	W
9	ESN0303	Pollutants emission control	1					S2OZE_W04	15	30	1	0,5	T				S	W
10	ESN0303	Pollutants emission control			1			S2OZE_U06	15	30	1	0,75	T	Z		P	S	W
		Total	8	2	2	4	1		255	510	17	10,75						

[2]Traditional – enter T, remote – enter Z
[3]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)
[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
14	3	4	4	1	390	900	30	18,25

Semester 2

Obligatory courses number of ECTS points 9

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN0550	Mathematical modelling of energy generation installations	2					K2ENG_W05	30	60	2	1	T	E			K	Ob
2	ESN0550	Mathematical modelling of energy generation installations			4			K2ENG_U07	60	120	4	3	T	Z		P	K	Ob
3	ESN1115	New generation energy technologies	2					K2ENG_W04	30	90	3	1,5	T	E			K	Ob
		Total	4		4				120	370	9	5,5						

Optional courses (minimum 315 hours in semester, 21 ECTS points)

No..	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	JZL100655BK	Foreign Language (second), any level		3				K2ENG_U09	45	60	2	1,5	T	Z	O	P	KO	W
2	ESN0361	Refrigeration heating systems	1					S2OZE_W05	15	30	1	0,5	T				S	W
3	ESN0361	Refrigeration heating systems				1		S2OZE_U07 K2ENG_K04	15	30	1	0,75	T	Z		P	S	W
4	ESN0140	Wind power plants	1					S2OZE_W06	15	30	1	0,5	T				S	W
5	ESN0140	Wind power plants				2		S2OZE_U08	30	60	2	1,5	T	Z		P	S	W
6	ESN0150	Geothermal power engineering	1					S2OZE_W07	15	30	1	0,5	T				S	W
7	ESN0150	Geothermal power engineering		1				S2OZE_U09	15	30	1	0,75	T	Z		P	S	W
8	ESN1123	Power production systems and technology from biomass	2					S2OZE_W08	30	60	2	1	T				S	W
9	ESN1123	Power production systems and technology from biomass		1				S2OZE_U10	15	30	1	0,75	T	Z		P		W
10	ESN1123	Power production systems and technology from biomass					1	S2OZE_U11	15	30	1	0,75	T	Z		P	S	W
11	ESN0203	Photo-thermal energy conversion system	1					S2OZE_W09	15	30	1	0,5	T				S	W
12	ESN0203	Photo-thermal energy conversion system				2		S2OZE_U12			2	1,5	T			P	S	W

13	ESN1362	Master individual student project				4		K2ENG_U01 K2ENG_U03 K2ENG_K01 K2ENG_K04	60	150	5	2	T	Z		P	K	W
		Total	6	5		9	1		315	450	21	12,5						

[2]Traditional – enter T, remote – enter Z
[3]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)
[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
10	5	4	9	1	435	900	30	18

Semester 3

Obligatory courses number of ECTS points 9

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	ESN1062	Energy systems	2					K2ENG_W08	30	60	2	1	T	Z			K	Ob
2	ESN1062	Energy systems		1				K2ENG_U08	15	30	1	0,75	T	Z		P	K	Ob
3	ESN1300	Environmental management	2					K2ENG_W06 K2ENG_K02	30	60	2	1	T	Z			K	Ob
4	ESN1380	Master seminar					2	K2ENG_U01 K2ENG_U02 K2ENG_K01 K2ENG_K03 K2ENG_K04 K2ENG_K05	30	60	2	1,5	T	Z		P	K	Ob
5	ESN0365	Marketing and management	2					K2ENG_W06	30	60	2	1	T	Z			KO	Ob
		Total	6	1			2		135	270	9	5,25						

Optional courses (minimum 15 hours in semester, 21 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol **GK**)	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form[2] of course/group of courses	Way[3] of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes[1]			university-wide[4]	practical[5]	kind[6]	type[7]
1	HMH100200BK	Humanities	1					K2ENG_W06 K2ENG_K02	15	30	1	0,5	T	Z	O		KO	W
2	ESN1430	Master thesis						K2ENG_U01 K2ENG_U02 K2ENG_U03 K2ENG_K01 K2ENG_K04 K2ENG_K05		600	20	4	T	Z		P		W
		Total	1						15	630	21	4,5						

[2]Traditional – enter T, remote – enter Z
[3]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)
[4]University-wide course /group of courses – enter O
[5]Practical course / group of courses – enter P. For the group of courses – in brackets enter the number of ECTS points assigned to practical courses
[6] KO – general education, PD – basic sciences, K – field-of-studies, S – specialization
[7] Optional – enter W, obligatory – enter Ob

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 BK classes[1]
lec	cl	lab	pr	sem				
7	1			2	150	900	30	9,75

2. Set of examinations in semestral arrangement

Course code	Names of courses ending with examination	Semester
ESN0910 ESN0502 ESN0200	1. Probability theory 2. Numerical methods 3. Quantum physics	1
ESN0550 ESN1115	1. Mathematical modelling of energy generation installations 2. New generation energy technologies	2

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

Semester	Allowable deficit of ECTS points after semester
1	10
2	0