

PLAN OF STUDY

FACULTY: MECHANICAL AND POWER ENGINEERING

MAIN FIELD OF STUDY: POWER ENGINEERING

EDUCATION LEVEL: 2nd level, Master of Science

FORM OF STUDIES: full-time

PROFILE: general academic

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

LANGUAGE OF STUDY: polish

Faculty Council Resolution of 20.09.2017
In effect since 01.10.2017

Plan of studies structure in point layout

30			
29		master individual	
28		student project	
27			
26			
25			
24			master
23			thesis
22			
21			
20			
19			
18			
17			
16			
15			
14	quantum		
13	physics		
12			
11			
10	numerical		master seminar
9	methods		
8			
7			
6			
5	probability		
4	theory	humanities	
3			marketing and
2		foreign	management
1	foreign language	language	
	sem. 1	sem. 2	sem. 3

basic and obligatory courses
general and obligatory courses
general and optional courses
obligatory main-field-of-study courses
optional main-field-of-study courses
optional/specialization 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) number of ECTS points 17

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	JZL100709	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

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

²Traditional – enter T, remote – enter Z

³Exam – 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)

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

⁵Practical 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

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
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						

Altogether in semester 1

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 8

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	ESN0553	Mathematical Modelling of Energy Generation Installations	2					K2ENG_W05	30	90	3	1,5	T	E			K	Ob
2	ESN0553	Mathematical Modelling of Energy Generation Installations			4			K2ENG_U07	60	60	2	1,5	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	240	8	4,5						

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

²Traditional – enter T, remote – enter Z

³Exam – 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)

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

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

⁶KO – general education, PD – basic sciences, K – field-of-studies, S – specialization

⁷Optional – enter W, obligatory – enter Ob

Optional courses (minimum 330 hours in semester) number of ECTS points 22

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			universit y-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	HS100400BK	Humanities	1					K2ENG_W06 K2ENG_K02 K2ENG_K06	15	60	2	1	T	Z	O		KO	W
3	ESN0251	Installations for Environment Protection - Optimalization and Exploitation	1					S2CCK_W08	15	30	1	0,5	T	Z			S	W
4	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
5	ESN1074	Power Systems Based on Renewable and Waste Energy	1					S2CCK_W09	15	30	1	0,5	T	Z			S	W
6	ESN1074	Power Systems Based on Renewable and Waste Energy		1				S2CCK_U06	15	30	1	0,75	T	Z		P	S	W
7	ESN1246	Ventilation and Air-conditioning	1					S2CCK_W07	15	30	1	0,5	T	Z			S	W
8	ESN1246	Ventilation and Air-conditioning			1			S2CCK_U11	15	30	1	0,75	T	Z		P		W
9	ESN0276	Heating and Air-condition Installation	1					S2CCK_W03	15	30	1	0,5	T	Z			S	W
10	ESN0276	Heating and Air-condition Installation			1			S2CCK_U11	15	30	1	0,75	T	Z		P	S	W
11	ESN0276	Heating and Air-condition Installation				1		S2CCK_U04	15	30	1	0,75	T	Z		P	S	W
12	ESN0276	Cryogenic Installations	2					S2CCK_W12	30	60	2	1	T	Z			S	W
13	ESN0277	Cryogenic Installations				1		S2CCK_U12	15	30	1	0,75	T	Z		P	S	W
14	ESN0277	Heat Pumps and Heat Transformers	1					S2CCK_W05 K2ENG_K02	15	30	1	0,5	T	Z			S	W
15	ESN0822	Heat Pumps and Heat Transformers				1		S2CCK_U10	15	30	1	0,75	T	Z		P	S	W
16	ESN0822	Master Individual Student Project				4		K2ENG_U01 K2ENG_U03 K2ENG_K04 K2ENG_K05	60	120	4	1	T	Z		P	K	W
Total			8	4	2	6	2		330	660	22	12,25						

Altogether in semester 2

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	4	6	6	2	450	900	30	16,75

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

²Traditional – enter T, remote – enter Z

³Exam – 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)

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

⁵Practical 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

Semester 3

Obligatory courses number of ECTS points 10

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			universit y-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	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
5	ESN0367	Marketing and Management	2					K2ENG_W07	30	90	3	1,5	T	Z			KO	Ob
Total			6	1			2		135	300	10	5,75						

Optional courses number of ECTS points 20

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			universit y-wide ⁴	practical ⁵	kind ⁶	type ⁷
1	ESN1430	Master Thesis						K2ENG_U01 K2ENG_U02 K2ENG_U03 K2ENG_K01 K2ENG_K04 K2ENG_K05		600	20	4	T	Z		P		W
Total										600	20	4						

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

²Traditional – enter T, remote – enter Z

³Exam – 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)

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

⁵Practical 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 3

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				
6	1			2	135	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 ESN0553	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