

# FACULTY OF MECHANICAL AND POWER ENGINEERING

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

*full-time studies 1st level*

## **PLANS of STUDIES**

Electric Power Engineering .....	2
Thermal Power Engineering .....	16

Update: Faculty Council Resolution of 10.07.2013

**Edited adjustment\_April 2014**

## **PLAN OF STUDIES**

**FACULTY.OF MECHANICAL AND POWER ENGINEERING**

**MAIN FIELD OF STUDY: POWER ENGINEERING**

**EDUCATION LEVEL:** 1st level, inżynier

**FORM OF STUDIES:** full-time

**PROFILE:** general academic

**SPECIALIZATION: ELECTRIC 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

30	informatics	humanities				
28		informatics			professional practice	
26					engineer individual student project	engineering thesis
24						
22						
20	chemistry					
18						
16	physics					engineer sem.
14		chemistry				
12		physics				
10						
8	mathematics				computer-aided design	
6		mathematics			humanities	
4					foreign language	management humanities
2					foreign language	sport. classes
	sem.1	sem.2	sem.3	sem.4	sem.5	sem.6

Legend

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 30

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	MAP1142	Mathematical Analysis 1A	2					K1ENG_W02 K1ENG_K01	30	150	5	2,5	T	E	O		PD	Ob
2	MAP1142	Mathematical Analysis 1A		2				K1ENG_U08 K1ENG_K01	30	90	3	2,25	T	Z	O	P	PD	Ob
3	MAP1140	Algebra and Analytic Geometry	2					K1ENG_W01 K1ENG_K01	30	60	2	1	T	E	O		PD	Ob
4	MAP1140	Algebra and Analytic Geometry		1				K1ENG_U07 K1ENG_K01	15	60	2	1,5	T	Z	O	P	PD	Ob
5	FZP1065	Physics 1.6	2					K1ENG_W03 K1ENG_K01 K1ENG_K02 K1ENG_K03 K1ENG_K04	30	90	3	1,5	T	E	O		PD	Ob
6	FZP1065	Physics 1.6		2				K1ENG_U03 K1ENG_K01 K1ENG_K02 K1ENG_K03 K1ENG_K04	30	60	2	1,5	T	Z	O	P	PD	Ob
7	CHC1101	Chemistry	2					K1ENG_W04	30	90	3	1,5	T	Z	O		PD	Ob
8	ESN0371	Power industry machinery	2					K1ENG_W08	30	60	2	1	T	Z			K	Ob
9	ESN0220	Descriptive geometry	2					K1ENG_W07	30	60	2	1	T	Z			K	Ob
10	ESN0220	Descriptive geometry		1				K1ENG_U13	15	30	1	0,75	T	Z		P	K	Ob
11	ESN0780	Basics of metrology and experiment techniques	2					K1ENG_W05	30	60	2	1	T	Z			K	Ob
12	ESN0780	Basics of metrology and experiment techniques		1				K1ENG_U11 K1ENG_U12	15	30	1	0,75	T	Z		P	K	Ob
13	INN1004	Information Technologies	2					K1ENG_W06	30	60	2	1	T	Z	O		KO	Ob
Total			16	7	0	0	0		345	900	30	17,25						

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup> 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 <sup>1</sup>
lec	cl	lab	pr	sem				
16	7	0	0	0	345	900	30	17,25

## Semester 2

### Obligatory courses number of ECTS points 30

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	PRZ1152	Intellectual and Industrial Property Protection	2					K1ENG_W13	30	60	2	1	T	Z	O		KO	Ob
2	INN1003	Application Packages			2			K1ENG_U02	30	60	2	1,5	T	Z	O	P	KO	Ob
3	ESN0780	Basics of Metrology and Experiment Techniques			1			K1ENG_U11 K1ENG_U12	15	30	1	0,75	T	Z		P	K	Ob
4	CHC1101	Chemistry			1			K1ENG_U10	15	30	1	0,75	T	Z	O	P	PD	Ob
5	ESN0730	Fundamental Mechanics and Strength of Materials	1					K1ENG_W12	15	30	1	0,5	T	Z			K	Ob
6	ESN0730	Fundamental Mechanics and Strength of Materials		1				K1ENG_U18	15	30	1	0,75	T	Z		P	K	Ob
7	ESN0800	Basics of Thermodynamics	2					K1ENG_W11	30	60	2	1	T	Z			K	Ob
8	ESN0800	Basics of Thermodynamics		1				K1ENG_U16	15	30	1	0,75	T	Z		P	K	Ob
9	ESN0760	Fundamentals of Fluid Mechanics	2					K1ENG_W10	30	60	2	1	T	Z			K	Ob
10	ESN0760	Fundamentals of Fluid Mechanics		1				K1ENG_U14	15	30	1	0,75	T	Z		P	K	Ob
11	ESN0710	Fundamentals of Materials Science	2					K1ENG_W09	30	90	3	1,5	T	E			K	Ob
12	FZP1066	Physics 2.11	2					K1ENG_W03 K1ENG_K01 K1ENG_K02 K1ENG_K03 K1ENG_K04	30	90	3	1,5	T	E	O		PD	Ob
13	FZP1066	Physics 2.11			2			K1ENG_W03 K1ENG_K01 K1ENG_K02 K1ENG_K03 K1ENG_K04	30	60	2	1,5	T	Z	O	P	PD	Ob
14	MAP1144	Mathematical Analysis 2.2A	3					K1ENG_W02 K1ENG_K01	45	150	5	2,5	T	E	O		PD	Ob
15	MAP1144	Mathematical Analysis 2.2A		2				K1ENG_U08 K1ENG_K01	30	90	3	2,25	T	Z	O	P	PD	Ob
Total			14	5	6				375	900	30	18						

### Obligatory courses (optionally in English) number of ECTS points 8

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
	ESN0731	Fundamental Mechanics and Strength of Materials	1					K1ENG_W12	15	30	1	0,5	T	Z			K	Ob
2	ESN0731	Fundamental Mechanics and Strength of Materials		1				K1ENG_U18	15	30	1	0,75	T	Z		P	K	Ob
3	ESN0801	Basics of Thermodynamics	2					K1ENG_W11	30	60	2	1	T	Z			K	Ob
4	ESN0801	Basics of Thermodynamics		1				K1ENG_U16	15	30	1	0,75	T	Z		P	K	Ob
5	ESN0761	Fundamentals of Fluid Mechanics	2					K1ENG_W10	30	60	2	1	T	Z			K	Ob
6	ESN0761	Fundamentals of Fluid Mechanics		1				K1ENG_U14	15	30	1	0,75	T	Z		P	K	Ob

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
14	5	6	0	0	375	900	30	18

### Semester 3

#### Obligatory courses number of ECTS points 30

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0111	Ecology	2					K1ENG_W19 K1ENG_K02	30	60	2	1	T	Z			K	Ob

2	ESN0460	Mechanics and Strength of Materials	2					K1ENG_W12	30	90	2	1	T	Z			K	Ob
3	ESN0460	Mechanics and Strength of Materials		2				K1ENG_U18	30	90	2	1,5	T	Z		P	K	Ob
4	ESN1040	Combustion and Fuels	2					K1ENG_W18	30	90	3	1,5	T	E			K	Ob
5	ESN1040	Combustion and Fuels		1				K1ENG_U25 K1ENG_U26	15	30	1	0,75	T	Z		P	K	Ob
6	ESN1040	Combustion and Fuels			1			K1ENG_U25 K1ENG_U26	15	30	1	0,75	T	Z		P	K	Ob
7	ESN1190	Thermodynamic	1					K1ENG_W11	15	60	2	1	T	E			K	Ob
8	ESN1190	Thermodynamic		1				K1ENG_U16	15	30	1	0,75	T	Z		P	K	Ob
9	ESN0470	Fluid Mechanics	1					K1ENG_W10	15	60	2	1	T	E			K	Ob
10	ESN0470	Fluid Mechanics		1				K1ENG_U14	15	30	1	0,75	T	Z		P	K	Ob
11	ESN0680	Electrical Engineering Fundamentals	2					K1ENG_W16	30	60	2	1	T	Z			K	Ob
12	ESN0680	Electrical Engineering Fundamentals		1				K1ENG_U22	15	30	1	0,75	T	Z		P	K	Ob
13	ESN0660	Fundamentals of Electronics	1					K1ENG_W15	15	30	1	0,5	T	Z			K	Ob
14	ESN0660	Fundamentals of Electronics			1			K1ENG_U21	15	30	1	0,75	T	Z		P	K	Ob
15	ESN0650	Fundamentals of Control Systems	2					K1ENG_W14	30	90	3	1,5	T	E			K	Ob
16	ESN0650	Fundamentals of Control Systems		1				K1ENG_U19	15	30	1	0,75	T	Z		P	K	Ob
17	ESN0420	Engineering Materials and Consumables	1					K1ENG_W09	15	30	1	0,5	T	Z			K	Ob
18	ESN0420	Engineering Materials and Consumables			1			K1ENG_U24	15	30	1	0,75	T	Z		P	K	Ob
19	ESN0940	Technical Drawing				2		K1ENG_U13	30	60	2	1,5	T	Z		P	K	Ob
Total			14	7	3	2	0		390	960	30	18						

### Obligatory courses (optionally in English) number of ECTS points 24

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 <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0461	Mechanics and Strength of Materials	2					K1ENG_W12	30	90	2	1	T	Z			K	Ob
2	ESN0461	Mechanics and Strength of Materials		2				K1ENG_U18	30	90	2	1,5	T	Z		P	K	Ob
3	ESN1043	Combustion and Fuels	2					K1ENG_W18	30	90	3	1,5	T	E			K	Ob
4	ESN1043	Combustion and Fuels		1				K1ENG_U25 K1ENG_U26	15	30	1	0,75	T	Z		P	K	Ob
5	ESN1043	Combustion and Fuels			1			K1ENG_U25 K1ENG_U26	15	30	1	0,75	T	Z		P	K	Ob
6	ESN1191	Thermodynamic	1					K1ENG_W11	15	60	2	1	T	E			K	Ob
7	ESN1191	Thermodynamic		1				K1ENG_U16	15	30	1	0,75	T	Z		P	K	Ob
8	ESN0471	Fluid Mechanics	1					K1ENG_W10	15	60	2	1	T	E			K	Ob
9	ESN0471	Fluid Mechanics		1				K1ENG_U14	15	30	1	0,75	T	Z		P	K	Ob
10	ESN0681	Fundamentals of Electrical Engineering	2					K1ENG_W16	30	60	2	1	T	Z			K	Ob
11	ESN0681	Fundamentals of Electrical Engineering		1				K1ENG_U22	15	30	1	0,75	T	Z		P	K	Ob
12	ESN0661	Fundamentals of Electronics	1					K1ENG_W15	15	30	1	0,5	T	Z			K	Ob
13	ESN0661	Fundamentals of Electronics			1			K1ENG_U21	15	30	1	0,75	T	Z		P	K	Ob
14	ESN0652	Fundamentals of Control Systems	2					K1ENG_W14	30	90	3	1,5	T	E			K	Ob
15	ESN0652	Fundamentals of Control Systems		1				K1ENG_U19	15	30	1	0,75	T	Z		P	K	Ob

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<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
14	7	3	2	0	390	960	30	18

## Semester 4

### Obligatory courses number of ECTS points 21

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0400	Electrical Machines and Devices	2					K1ENG_W20	30	90	3	1,5	T	E			K	Ob
2	ESN0400	Electrical Machines and Devices			1			K1ENG_U27 K1ENG_K01 K1ENG_K04	15	30	1	0,75	T	Z		P	K	Ob
3	ESN0875	Heat Transfer	2					K1ENG_W21	30	60	2	1	T	Z			K	Ob
4	ESN0875	Heat Transfer		2				K1ENG_U28	30	60	2	1,5	T	Z		P	K	Ob
5	ESN1200	Thermodynamic - lab			2			K1ENG_U17 K1ENG_K04	30	60	2	1,5	T	Z		P	K	Ob
6	ESN0480	Fluid Mechanics - lab			2			K1ENG_U15	30	60	2	1,5	T	Z		P	K	Ob
7	ESN0680	Electrical Engineering Fundamentals			1			K1ENG_U23	15	30	1	0,75	T	Z		P	K	Ob
8	ESN0622	Basics of Machine Design I	2					K1ENG_W22	30	60	2	1	T	Z			K	Ob
9	ESN0622	Basics of Machine Design I				1		K1ENG_U30	15	60	2	1,5	T	Z		P	K	Ob
10	ESN0062	CAD			2			K1ENG_U13	30	60	2	1,5	T	Z		P	K	Ob
11	ESN0650	Fundamentals of Control Systems			2			K1ENG_U20	30	60	2	1,5	T	Z		P	K	Ob
Total			6	2	10	1	0		285	630	21	14						



### Obligatory courses (optionally in English) number of ECTS points 8

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0876	Heat Transfer	2					K1ENG_W21	30	60	2	1	T	Z			K	Ob
2	ESN0876	Heat Transfer		2				K1ENG_U28	30	60	2	1,5	T	Z		P	K	Ob
3	ESN0623	Basics of Machine Design I	2					K1ENG_W22	30	60	2	1	T	Z			K	Ob
4	ESN0623	Basics of Machine Design I				1		K1ENG_U30	15	60	2	1,5	T	Z		P	K	Ob

### Optional courses (minimum 120 hours in semester, 9 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0412	Turbomachinery	2					S1EEN_W02	30	90	3	1,5	T	E			S	W
2	ESN0412	Turbomachinery				1		S1EEN_U02	15	30	1	0,75	T	Z		P	S	W
3	ESN0840	Pumps and pumping systems	2					S1EEN_W03	30	60	2	1	T	Z			S	W
4	ESN0012	Electric apparatuses	1					S1EEN_W04	15	30	1	0,5	T	Z			S	W
5	ESN0825	Electric measurements	1					S1EEN_W01	15	30	1	0,5	T	Z			S	W
6	ESN0825	Electric measurements			1			S1EEN_U01	15	30	1	0,75	T	Z		P	S	W
Total			6	0	1	1	0	0	120	270	9	5						

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
12	2	11	2	0	405	900	30	19

## Semester 5

### Obligatory courses number of ECTS points 17

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0331	Utility Boilers	2					K1ENG_W25	30	60	3	1,5	T	E			K	Ob
2	ESN0331	Utility Boilers				1		K1ENG_U33	15	30	1	0,75	T	Z		P	K	Ob
3	ESN0523	Power Engineering Metrology	2					K1ENG_W24	30	90	3	1,5	T	E			K	Ob
4	ESN0523	Power Engineering Metrology			2			K1ENG_U32	30	60	2	1,5	T	Z		P	K	Ob
5	ESN0642	Basics of Machine Design II	2					K1ENG_W22	30	90	3	1,5	T	E			K	Ob
6	ESN0642	Basics of Machine Design II				1		K1ENG_U30	15	60	2	1,5	T	Z		P	K	Ob
7	ESN1190	Flue-gases Cleaning Techniques	2					K1ENG_W23	30	60	2	1	T	Z			K	Ob
8	ESN1190	Flue-gases Cleaning Techniques		1				K1ENG_U31	15	30	1	0,75	T	Z		P	K	Ob
Total			8	1	2	2	0		195	480	17	10						

### Obligatory courses (optionally in English) number of ECTS points 5

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0643	Basics of Machine Design II	2					K1ENG_W22	30	90	3	1,5	T	E			K	Ob
2	ESN0643	Basics of Machine Design II				1		K1ENG_U30	15	60	2	1,5	T	Z		P	K	Ob

### Optional courses (minimum 210 hours in semester, 13 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	HSN100100BK	Humanities	2					K1ENG_W30 K1ENG_K02 K1ENG_K06	30	60	2	1	T	Z	O		KO	W
2	JZL100655BK	Foreign Language B2.1		4				K1ENG_U06	60	60	2	1,5	T	Z	O	P	KO	W
3		Advanced Design Methods			2			K1ENG_U13	30	90	3	2,25	T	Z		P	K	W
	ESN0064	CATIA																
	ESN1022	Solid Edge																
ESN0246	3D graphic																	
4	ESN0271	Process Engineering and Apparatus	2					S1EEN_W06	30	60	2	1	T	Z			S	W

5	ESN0271	Process Engineering and Apparatus		1				S1EEN_U04	15	30	1	0,75	T	Z		P	S	W
6	ESN1292	Electric Energy Generation	2					S1EEN_W04	30	60	2	1	T	Z			S	W
7	ESN1292	Electric Energy Generation				1		S1EEN_U03	15	30	1	0,75	T	Z		P	S	W
Total			6	5	2	1	0		210	390	13	8,25						

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup> 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 <sup>1</sup>
lec	cl	lab	pr	sem				
14	6	4	3	0	405	870	30	18,25

## Semester 6

### 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 <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0041	Research and Testing of Machines and Devices	1					K1ENG_W24	15	30	1	0,5	T	Z			K	Ob
2	ESN0041	Research and Testing of Machines and Devices			1			K1ENG_U33	15	30	1	0,75	T	Z		P	K	Ob
3	ESN0891	Power Distribution	2					K1ENG_W28	30	90	3	1,5	T	E			K	Ob
4	ESN0891	Power Distribution		1				K1ENG_U36	15	30	1	0,75	T	Z		P	K	Ob
5	ESN0136	Power and Heat Stations	2					K1ENG_W26	30	90	3	1,5	T	E			K	Ob
6	ESN0136	Power and Heat Stations			1			K1ENG_U34	15	30	1	0,75	T	Z		P	K	Ob
Razem			5	1	2	0	0		120	300	10	5,75						

**Optional courses (minimum 240 hours in semester, 20 ECTS points)**

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	JZL100655BK	Foreign Language B2.2		4				K1ENG_U06	60	90	3	2,25	T	Z	O	P	KO	W
2	ESN1350	Engineer Individual Student Project					4	K1ENG_U01 K1ENG_U03 K1ENG_U04 K1ENG_K01	60	120	4	1	T	Z		P	K	W
3	ESN1410	Proffecional Practise						K1ENG_U03 K1ENG_K04 K1ENG_K05		120	4	0	T	Z		P	K	W
4	ESN0352	Cryogenics and Gas Technologies in Power Engineering	2					S1EEN_W09	30	60	3	1,5	T	E			S	W
5	ESN0352	Cryogenics and Gas Technologies in Power Engineering		1				S1EEN_U07	15	30	1	0,75	T	Z		P	S	W
6	ESN0352	Cryogenics and Gas Technologies in Power Engineering			1			S1EEN_U08	15	30	1	0,75	T	Z		P	S	W
7	ESN0025	Automatics of Power Systems	1					S1EEN_W08	15	15	1	0,5	T	Z			S	W
8	ESN0025	Automatics of Power Systems			1			S1EEN_U06	15	15	1	0,75	T	Z		P	S	W
9	ESN0555	Electrical Drives	1					S1EEN_W01 S1EEN_K01	15	30	1	0,5	T	Z			S	W
10	ESN0555	Electrical Drives			1			S1EEN_U01	15	30	1	0,75	T	Z		P	S	W
Total			4	5	3	4	0		240	540	20	8,75						

**Optional/specialization courses (optionally in English) 5 ECTS**

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0353	Cryogenics and Gas Technologies in Power Engineering	2					S1EEN_W09	30	60	3	1,5	T	E			S	W
2	ESN0353	Cryogenics and Gas Technologies in Power Engineering		1				S1EEN_U07	15	30	1	0,75	T	Z		P	S	W
3	ESN0353	Cryogenics and Gas Technologies in Power Engineering			1			S1EEN_U08	15	30	1	0,75	T	Z		P	S	W

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
9	6	5	4	0	360	840	30	14,5

## Semester 7

### Obligatory courses number of ECTS points 2

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0171	Power engineering and environmental	1					K1ENG_W29 K1ENG_K02	15	30	1	0,5	T	Z			K	Ob
2	ESN1370	Engineer seminar					1	K1ENG_U01 K1ENG_U03 K1ENG_U05 K1ENG_K01 K1ENG_K04	15	30	1	0,75	T	Z		P	K	Ob
Total			1	0	0	0	1		30	60	2	1,25						

### Optional courses (minimum 210 hours in semester, 28 ECTS points)

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	HSN100100BK	Humanities	1					K1ENG_W30 K1ENG_K02 K1ENG_K06	15	30	1	0,5	T	Z	O		KO	W
2	ZSN100100BK	Management science	1					K1ENG_W30	15	30	1	0,5	T	Z	O		KO	W

									K1ENG_K05										
3	WFW00000BK	Sporting classes		2					K1ENG_K03	30	30	1	1	T	Z	O	P	KO	W
4	ESN0168	Nuclear power engineering	2						S1EEN_W12	30	60	2	1	T	Z			S	W
5	ESN0168	Nuclear power engineering		1					S1EEN_U11	15	30	1	0,75	T	Z		P	S	W
6	ESN0168	Nuclear power engineering			1				S1EEN_U12	15	30	1	0,75	T	Z		P	S	W
7	ESN1007	Diagnostics and electric shock protection	2						S1EEN_W11	30	60	2	1	T	Z			S	W
8	ESN1007	Diagnostics and electric shock protection			1				S1EEN_U10	15	30	1	0,75	T	Z		P	S	W
9	ELR022405	Designing of power networks and electrical installation	2						S1EEN_W10	30	60	2	1	T	Z			S	W
10	ELR022405	Designing of power networks and electrical installation				1			S1EEN_U09 K1ENG_K06	15	30	1	0,75	T	Z		P	S	W
11	ESN1420	Engineer thesis							K1ENG_U01 K1ENG_U03 K1ENG_U04 K1ENG_U05 K1ENG_K01 K1ENG_K04 K1ENG_K06		450	15	2	T	Z		P		W
Total			8	3	2	1	0			210	840	28	10						

### Optional/specialization courses (optionally in English) 5 ECTS

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			universit y-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0169	Nuclear power engineering	2					S1EEN_W12	30	60	2	1	T	Z			S	W
2	ESN0169	Nuclear power engineering		1				S1EEN_U11	15	30	1	0,75	T	Z		P	S	W
3	ESN0169	Nuclear power engineering			1			S1EEN_U12	15	30	1	0,75	T	Z		P	S	W

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
9	3	2	1	1	240	900	30	11,25

## 2. Set of examinations in semestral arrangement

Course code	Names of courses ending with examination	Semester
MAP1142 MAP1140 FZP1065	1. Mathematical Analysis 1.1A 2. Algebra and Analytic Geometry A 3. Physics 1.6	1
MAP1144 FZP1066 ESN0710	1. Mathematical Analysis 2.2A 2. Physics 2.11 3. Fundamentals of Materials Science	2
ESN0650 (ESN0652) ESN0470 (ESN0471) ESN1190 (ESN0191) ESN1040 (ESN1043)	1. Fundamentals of Control Systems 2. Fluid Mechanics 3. Thermodynamic 4. Combustion and Fuels	3
ESN0400 ESN0412	1. Electrical machines and devices 2. Turbomachinery	4
ESN0642 (ESN0643) ESN0523 ESN0331	1. Basics of Machine Design II 2. Power Engineering Metrology 3. Utility Boilers	5
ESN0136 ESN0891 ESN0352 (ESN0353)	1. Power and Heat Stations 2. Power Distribution 3. Cryogenics and Gas Technologies in Power Engineering	6

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

Semester	Allowable deficit of ECTS points after semester
1	15
2	17
3	14
4	12
5	12
6	0

## **PLAN OF STUDIES**

**FACULTY MECHANICAL AND POWER ENGINEERING**

**MAIN FIELD OF STUDY: POWER ENGINEERING**

**EDUCATION LEVEL:** 1st level, inżynier inżynier

**FORM OF STUDIES:** full-time

**PROFILE:** general academic

**SPECIALIZATION: THERMAL POWER ENGINEERING**

**LANGUAGE OF STUDY: POLISH**

Faculty Council Resolution of 26.09.2012  
In effect since 01.10.2012

**Edited adjustment\_April 2014**



**Plan of studies structure in point layout**

30	<b>Informatics</b>	<b>Humanities. Course</b>				
28		<b>informatics</b>			<b>Proffecional Practice</b>	
26					<b>Engineer individual student project</b>	
24						<b>Engineering thesis</b>
22						
20	<b>Chemistry</b>					
18						
16	<b>Physics</b>					<b>Enginer.seminar</b>
14		<b>Chemistry</b>				
12		<b>Physics</b>				
10						
8	<b>Mathematics</b>					
6		<b>Mathematics</b>				
4				<b>computer-aided design</b>	<b>Humanities.</b>	
2				<b>Foreign Language</b>	<b>Foreign Language</b>	<b>Marketing humanites. Sport.calasses</b>
	sem.1	sem.2	sem.3	sem.4	sem.5	sem.6

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 30

N O.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	MAP1142	Mathematical Analysis 1.1A	2					K1ENG_W02	30	150	5	2,5	T	E	O		PD	Ob
2	MAP1142	Mathematical Analysis 1.1A		2				K1ENG_U08	30	90	3	2,25	T	Z	O	P	PD	Ob
3	MAP1140	Algebrý and Analytic Geometry	2					K1ENG_W01	30	60	2	1	T	E	O		PD	Ob
4	MAP1140	Algebrý and Analytic Geometry		1				K1ENG_U07	15	60	2	1,5	T	Z	O	P	PD	Ob
5	FZP1065	Physics 1.6	2					K1ENG_W03	30	90	3	1,5	T	E	O		PD	Ob
6	FZP1065	Physics 1.6		2				K1ENG_U09	30	60	2	1,5	T	Z	O	P	PD	Ob
7	CHC1101	Chemistry	2					K1ENG_W04	30	90	3	1,5	T	Z	O		PD	Ob
8	ESN0371	Power Industry Machinery	2					K1ENG_W08	30	60	2	1	T	Z			K	Ob
9	ESN0220	Descriptive Geometry	2					K1ENG_W07	30	60	2	1	T	Z			K	Ob
10	ESN0220	Descriptive Geometry		1				K1ENG_U13	15	30	1	0,75	T	Z		P	K	Ob
11	ESN0780	Basics of Metrology and Experiment Techniques	2					K1ENG_W05	30	60	2	1	T	Z			K	Ob
12	ESN0780	Basics of Metrology and Experiment Techniques		1				K1ENG_U11	15	30	1	0,75	T	Z		P	K	Ob
13	INN1004	Information Technologies	2					K1ENG_W06	30	60	2	1	T	Z	O		KO	Ob
Total			16	7					345	900	30	17,25						

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
16	7				345	900	30	17,25

## Semester 2

### Obligatory courses number of ECTS points 30

N o.	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 <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	MAP1144	Mathematical analysis 2.2A	3					K1ENG_W02	45	150	5	2,5	T	E	O		PD	Ob
2	MAP1144	Mathematical analysis 2.2A		2				K1ENG_U08	30	90	3	2,25	T	Z	O	P	PD	Ob
3	FZP1066	Physics 2.11	2					K1ENG_W03	30	90	3	1,5	T	E	O		PD	Ob
4	FZP1066	Physics 2.11			2			K1ENG_U09	30	60	2	1,5	T	Z	O	P	PD	Ob
5	CHC1101	Chemistry			1			K1ENG_U10	15	30	1	0,75	T	Z	O	P	PD	Ob
6	ESN0710	Fundamentals of Materials Science	2					K1ENG_W09	30	90	3	1,5	T	E			K	Ob
7	ESN0760	Fundamentals of Fluid Mechanics	2					K1ENG_W10	30	60	2	1	T	Z			K	Ob
8	ESN0760	Fundamentals of Fluid Mechanics		1				K1ENG_U14	15	30	1	0,75	T	Z		P	K	Ob
9	ESN0800	Basics of Thermodynamics	2					K1ENG_W11	30	60	2	1	T	Z			K	Ob
10	ESN0800	Basics of Thermodynamics		1				K1ENG_U16	15	30	1	0,75	T	Z		P	K	Ob
11	ESN0730	Fundamental Mechanics and Strength of Materials	1					K1ENG_W12	15	30	1	0,5	T	Z			K	Ob
12	ESN0730	Fundamental Mechanics and Strength of Materials		1				K1ENG_U18	15	30	1	0,75	T	Z		P	K	Ob
13	ESN0780	Basics of metrology and experiment techniques			1			K1ENG_U12	15	30	1	0,75	T	Z		P	K	Ob
14	INN1003	Application packages			2			K1ENG_U02	30	60	2	1,5	T	Z	O	P	KO	Ob
15	PRZ1152	Intellectual and Industrial Property Protection	2					K1ENG_W13	30	60	2	1	T	Z	O		KO	Ob
Total			14	5	6				375	900	30	18						

### Obligatory courses (optionally in English) number of ECTS points 8

N o.	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 <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0761	Fundamentals of Fluid Mechanics	2					K1ENG_W10	30	60	2	1	T	Z			K	Ob
2	ESN0761	Fundamentals of Fluid Mechanics		1				K1ENG_U14	15	30	1	0,75	T	Z		P	K	Ob
3	ESN0801	Basics of Thermodynamics	2					K1ENG_W11	30	60	2	1	T	Z			K	Ob
4	ESN0801	Basics of Thermodynamics		1				K1ENG_U16	15	30	1	0,75	T	Z		P	K	Ob
5	ESN0731	Fundamental Mechanics and Strength of Materials	1					K1ENG_W12	15	30	1	0,5	T	Z			K	Ob
6	ESN0731	Fundamental Mechanics and Strength of Materials		1				K1ENG_U18	15	30	1	0,75	T	Z		P	K	Ob

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
14	5	6			375	900	30	18

### Semester 3

#### Obligatory courses number of ECTS points 30

N o.	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 <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0460	Mechanics and Strength of Materials	2					K1ENG_W12	30	60	2	1	T	Z			K	Ob
2	ESN0460	Mechanics and Strength of Materials		2				K1ENG_U18	30	60	2	1,5	T	Z		P	K	Ob
3	ESN1040	Combustion and Fuels	2					K1ENG_W18	30	90	3	1,5	T	E			K	Ob
4	ESN1040	Combustion and Fuels		1				K1ENG_U25 K1ENG_U26	15	30	1	0,75	T	Z		P	K	Ob
5	ESN1040	Combustion and Fuels			1			K1ENG_U25 K1ENG_U26	15	30	1	0,75	T	Z		P	K	Ob
6	ESN1190	Thermodynamic	1					K1ENG_W11	15	60	2	1	T	E			K	Ob
7	ESN1190	Thermodynamic		1				K1ENG_U16	15	30	1	0,75	T	Z		P	K	Ob
8	ESN0470	Fluid Mechanics	1					K1ENG_W10	15	60	2	1	T	E			K	Ob
9	ESN0470	Fluid Mechanics		1				K1ENG_U14	15	30	1	0,75	T	Z		P	K	Ob
10	ESN0680	Fundamentals of Electrical Engineering	2					K1ENG_W16	30	60	2	1	T	Z			K	Ob
11	ESN0680	Fundamentals of Electrical Engineering		1				K1ENG_U22	15	30	1	0,75	T	Z		P	K	Ob
12	ESN0660	Fundamentals of Electronics	1					K1ENG_W15	15	30	1	0,5	T	Z			K	Ob
13	ESN0660	Fundamentals of Electronics			1			K1ENG_U21	15	30	1	0,75	T	Z		P	K	Ob
14	ESN0650	Fundamentals of Control Systems	2					K1ENG_W14	30	90	3	1,5	T	E			K	Ob
15	ESN0650	Fundamentals of Control Systems		1				K1ENG_U19	15	30	1	0,75	T	Z		P	K	Ob
16	ESN0940	Technical drawing				2		K1ENG_U13	30	60	2	1,5	T	Z		P	K	Ob
17	ESN0420	Engineering Materials and Consumables	1					K1ENG_W09	15	30	1	0,5	T	Z			K	Ob
18	ESN0420	Engineering Materials and Consumables			1			K1ENG_U24	15	30	1	0,75	T	Z		P	K	Ob
19	ESN0111	Ecology	2					K1ENG_W19 K1ENG_K02	30	60	2	1	T	Z			K	Ob
Total			14	7	3	2			390	900	30	18						

### Obligatory courses (optionally in English) number of ECTS points 24

No.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0461	Mechanics and Strength of Materials	2					K1ENG_W12	30	60	2	1	T	Z			K	Ob
2	ESN0461	Mechanics and Strength of Materials		2				K1ENG_U18	30	60	2	1,5	T	Z		P	K	Ob
3	ESN1043	Combustion and Fuels	2					K1ENG_W18	30	90	3	1,5	T	E			K	Ob
4	ESN1043	Combustion and Fuels		1				K1ENG_U25	15	30	1	0,75	T	Z		P	K	Ob
5	ESN1043	Combustion and Fuels			1			K1ENG_U26	15	30	1	0,75	T	Z		P	K	Ob
6	ESN1191	Thermodynamic	1					K1ENG_W11	15	60	2	1	T	E			K	Ob
7	ESN1191	Thermodynamic		1				K1ENG_U16	15	30	1	0,75	T	Z		P	K	Ob
8	ESN0471	Fluid Mechanics	1					K1ENG_W10	15	60	2	1	T	E			K	Ob
9	ESN0471	Fluid Mechanics		1				K1ENG_U14	15	30	1	0,75	T	Z		P	K	Ob
10	ESN0681	Fundamentals of Electrical Engineering	2					K1ENG_W16	30	60	2	1	T	Z			K	Ob
11	ESN0681	Fundamentals of Electrical Engineering		1				K1ENG_U22	15	30	1	0,75	T	Z		P	K	Ob
12	ESN0661	Fundamentals of Electronics	1					K1ENG_W15	15	30	1	0,5	T	Z			K	Ob
13	ESN0661	Fundamentals of Electronics			1			K1ENG_U21	15	30	1	0,75	T	Z		P	K	Ob
14	ESN0652	Fundamentals of Control Systems	2					K1ENG_W14	30	90	3	1,5	T	E			K	Ob
15	ESN0652	Fundamentals of Control Systems		1				K1ENG_U19	15	30	1	0,75	T	Z		P	K	Ob

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
14	7	3	2		390	900	30	18

## Semester 4

### Obligatory courses number of ECTS points 21

N o.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0650	Fundamentals of Control Systems			2			K1ENG_U20 K1ENG_K04	30	60	2	1,5	T	Z		P	K	Ob
2	ESN0065	CAD			2			K1ENG_U13	30	60	2	1,5	T	Z		P	K	Ob
3	ESN0622	Basics of Machine Design I	2					K1ENG_W22	30	60	2	1	T	Z			K	Ob
4	ESN0622	Basics of Machine Design I				1		K1ENG_U30	15	60	2	1,5	T	Z		P	K	Ob
5	ESN0680	Fundamentals of Electrical Engineering			1			K1ENG_U23	15	30	1	0,75	T	Z		P	K	Ob
6	ESN0480	Fluid Mechanics - laboratory			2			K1ENG_U15 K1ENG_K04	30	60	2	1,5	T	Z		P	K	Ob
7	ESN1200	Thermodynamics - lab			2			K1ENG_U17 K1ENG_K04	30	60	2	1,5	T	Z		P	K	Ob
8	ESN0875	Heat Transfer	2					K1ENG_W21	30	60	2	1	T	Z			K	Ob
9	ESN0875	Heat Transfer		2				K1ENG_U28	30	60	2	1,5	T	Z		P	K	Ob
10	ESN0400	Electrical Machines and Devices	2					K1ENG_W20	30	90	3	1,5	T	E			K	Ob
11	ESN0400	Electrical Machines and Devices			1			K1ENG_U27 K1ENG_K01 K1ENG_K04	15	30	1	0,75	T	Z		P	K	Ob
Total			6	2	10	1			285	630	21	14						

### Obligatory courses (optionally in English) number of ECTS points 8

N o.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
3	ESN0623	Basics of Machine Design I	2					K1ENG_W22	30	60	2	1	T	Z			K	Ob
4	ESN0623	Basics of Machine Design I				1		K1ENG_U30	15	60	2	1,5	T	Z		P	K	Ob
8	ESN0876	Heat Transfer	2					K1ENG_W21	30	60	2	1	T	Z			K	Ob
9	ESN0876	Heat Transfer		2				K1ENG_U28	30	60	2	1,5	T	Z		P	K	Ob

### Optional courses (minimum 120 hours in semester, 9 ECTS points)

N o.	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 <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0850	Pumps and pumping systems	2					S1ENC_W01	30	60	2	1	T	Z			S	W
2	ESN0850	Pumps and pumping systems		1				S1ENC_U01	15	30	1	0,75	T	Z		P	S	W
3	ESN0410	Turbomachinery	2					S1ENC_W02	30	90	3	1,5	T	E			S	W
4	ESN0410	Turbomachinery		2				S1ENC_U02	30	60	2	1,5	T	Z		P	S	W
5	ESN0410	Turbomachinery				1		S1ENC_U03	15	30	1	0,75	T	Z		P	S	W
Total			4	3		1			120	270	9	5,5						

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
10	5	10	2		405	900	30	19,5

## Semester 5

### Obligatory courses number of ECTS points 17

N o.	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 <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN1190	Flue-gases Cleaning Techniques	2					K1ENG_W23	30	60	2	1	T	Z			K	Ob
2	ESN1190	Flue-gases Cleaning Techniques		1				K1ENG_U31	15	30	1	0,75	T	Z		P	K	Ob
3	ESN0642	Basics of Machine Design II	2					K1ENG_W22	30	90	3	1,5	T	E			K	Ob
4	ESN0642	Basics of Machine Design II				1		K1ENG_U30	15	60	2	1,5	T	Z		P	K	Ob
5	ESN0523	Power Engineering Metrology	2					K1ENG_W24	30	90	3	1,5	T	E			K	Ob
6	ESN0523	Power Engineering Metrology			2			K1ENG_U32	30	60	2	1,5	T	Z		P	K	Ob

7	ESN0331	Utility boilers	2					K1ENG_W25	30	90	3	1,5	T	E			K	Ob
8	ESN0331	Utility boilers				1		K1ENG_U33	15	30	1	0,75	T	Z		P	K	Ob
Total			8	1	2	2			195	510	17	10						

### Obligatory courses (optionally in English) number of ECTS points 5

N o.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0643	Basics of Machine Design II	2					K1ENG_W22	30	90	3	1,5	T	E			K	Ob
2	ESN0643	Basics of Machine Design II				1		K1ENG_U30	15	60	2	1,5	T	Z		P	K	Ob

### Optional courses (minimum 195 hours in semester, 13 ECTS points)

N o.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1		Advanced Project methods:			2				30	90	3	2,25	T	Z		P	K	W
	ESN0064	CATIA						K1ENG_U13										
	ESN1022	Solid Edge						K1ENG_U13										
	ESN0246	Grafika 3D						K1ENG_U13 K1ENG_U05 K1ENG_K06										
2	ESN0075	Refrigeration and Cryogenics	2					S1ENC_W03	30	90	3	1,5	T	E			S	W
3	ESN0075	Refrigeration and Cryogenics			2			S1ENC_U04	30	60	2	1,5	T	Z		P	S	W
4	ESN0310	Energy Conversion	2					S1ENC_W07	30	60	2	1	T	Z			S	W
5	ESN0310	Energy Conversion			1			S1ENC_U08	15	30	1	0,75	T	Z		P	S	W
6	JZL100707BK	Foreign language B2.1		4				K1ENG_U06	60	60	2	1,5	T	Z	O	P	KO	W
Total			4	4	5				195	390	13	8,5						

### Optional/specialization courses (optionally in English) 8 ECTS points

N o.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0078	Refrigeration and Cryogenics	2					S1ENC_W03	30	60	2	1	T	Z			S	W
2	ESN0078	Refrigeration and Cryogenics			2			S1ENC_U04	30	60	2	1,5	T	Z		P	S	W
3	ESN0321	Energy Conversion	2					S1ENC_W07	30	90	3	1,5	T	E			S	W
4	ESN0321	Energy Conversion			1			S1ENC_U08	15	30	1	0,75	T	Z		P	S	W



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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
12	5	7	2		390	900	30	18,5

## Semester 6

### Obligatory courses number of ECTS points 10

N o.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0136	Power and heat stations	2					K1ENG_W26	30	90	3	1,5	T	E			K	Ob
2	ESN0136	Power and heat stations			1			K1ENG_U34	15	30	1	0,75	T	Z		P	K	Ob
3	ESN0891	Power Distribution	2					K1ENG_W28	30	90	3	1,5	T	E			K	Ob
4	ESN0891	Power Distribution		1				K1ENG_U36	15	30	1	0,75	T	Z		P	K	Ob
5	ESN0041	Research and testing of machines and devices	1					K1ENG_W27	15	30	1	0,5	T	Z			K	Ob
6	ESN0041	Research and testing of machines and devices			1			K1ENG_U35	15	30	1	0,75	T	Z		P	K	Ob
Total			5	1	2				120	300	10	5,75						

### Optional courses (minimum 255 hours in semester, 20 ECTS points)

N o.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0211	Gas technologies	1					S1ENC_W05	15	30	1	0,5	T	Z			S	W
2	ESN0211	Gas technologies		1				S1ENC_U05	15	30	1	0,75	T	Z		P	S	W
3	ESN0834	Heat pumps and solar collectors	1					S1ENC_W06	15	30	1	0,5	T	Z			S	W
4	ESN0834	Heat pumps and solar collectors			1			S1ENC_U06	15	30	1	0,75	T	Z		P	S	W
5	ESN0834	Heat pumps and solar collectors				1		S1ENC_U07	15	30	1	0,75	T	Z		P	S	W
6	ESN0685	Basics of air-conditioning	2					S1ENC_W04	30	60	2	1	T	Z			S	W

7	ESN1350	Individual Engineering project				4		K1ENG_U01 K1ENG_U03 K1ENG_U04 K1ENG_K01	60	120	4	1	T	Z		P	K	W
8	HSN100100BK	Humanities subject	2					K1ENG_W30 K1ENG_K02 K1ENG_K06	30	60	2	1	T	Z	O		KO	W
9	JZL100708BK	Foreign language B2.2		4				K1ENG_U06	60	90	3	2,25	T	Z	O	P	KO	W
10	ESN1410	Training						K1ENG_U03 K1ENG_K04 K1ENG_K05		120	4	0	T	Z		P	K	W
Total			6	5	1	5			255	600	20	8,5						

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
11	5	7	2		390	900	30	18,5

## Semester 7

### Obligatory courses number of ECTS points 2

N o.	Course/group of courses code	Name of course/group of courses (denote group of courses with symbol <b>GK</b> )	Weekly number of hours					Field-of-study educational effect symbol	Number of hours		Number of ECTS points		Form <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN1370	Engineering diploma seminar					1	K1ENG_U01 K1ENG_U03 K1ENG_U05 K1ENG_K01 K1ENG_K04	15	30	1	0,75	T	Z		P	K	Ob
2	ESN0171	Power engineering and environmental	1					K1ENG_W29 K1ENG_K02	15	30	1	0,5	T	Z			K	Ob
Total			1				1		30	60	2	1,25						

### Optional courses (minimum 210 hours in semester, 28 ECTS points)

N o.	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 <sup>2</sup> of course/group of courses	Way <sup>3</sup> of crediting	Course/group of courses			
			lec	cl	lab	pr	sem		ZZU	CNPS	total	BK classes <sup>1</sup>			university-wide <sup>4</sup>	practical <sup>5</sup>	kind <sup>6</sup>	type <sup>7</sup>
1	ESN0240	Energy management	2					SIENC_W08	30	60	2	1	T	Z			S	W
2	ESN0240	Energy management		1				SIENC_U09	15	30	1	0,75	T	Z		P	S	W
3	ESN0340	Boilers and Small Power	2					SIENC_W09	30	60	2	1	T	Z			S	W
4	ESN0340	Boilers and Small Power		1				SIENC_U10	15	30	1	0,75	T	Z		P	S	W
5	ESN0971	Heat distribution networks	1					SIENC_W10	15	30	1	0,5	T	Z			S	W
6	ESN0971	Heat distribution networks		1				SIENC_U11	15	30	1	0,75	T	Z		P	S	W
7	ESN0011	Energy audit	1					SIENC_W11	15	30	1	0,5	T	Z			S	W
8	ESN0011	Energy audit			1			SIENC_U12	15	30	1	0,75	T	Z		P	S	W
9	HSN100100BK	Humanities	1					KIENG_W31 KIENG_K02 KIENG_K06	15	30	1	0,5	T	Z	O		KO	W
10	ZSN100100BK	Management science	1					KIENG_W30 KIENG_K05	15	30	1	0,5	T	Z	O		KO	W
11	WFW000000BK	Sporting classes		2				KIENG_K03	30	30	1	1	T	Z	O	P	KO	W
12	ESN1420	Engineer diploma dissertatnion						KIENG_U01 KIENG_U03 KIENG_U04 KIENG_U05 KIENG_K01 KIENG_K04 KIENG_K06		450	15	2	T	Z		P		W
Total			8	5	1				210	840	28	10						

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

<sup>2</sup>Traditional – enter T, remote – enter Z

<sup>3</sup>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)

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

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

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

<sup>7</sup>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 <sup>1</sup>
lec	cl	lab	pr	sem				
9	5	1		1	240	900	30	11,25

## 2. Set of examinations in semestral arrangement

Course code	Names of courses ending with examination	Semester
MAP1142 MAP1140 FZP1065	1. Mathematical Analysis 1.1A 2. Algebra and Analytic Geometry A 3. Physics 1.6	1
MAP1144 FZP1066 ESN0710	1. Mathematical Analysis 2.2A 2. Physics 2.11 3. Fundamentals of Materials Science	2
ESN0650 (ESN0652) ESN0470 (ESN0471) ESN1190 (ESN0191) ESN1040 (ESN1043)	1. Fundamentals of Control Systems 2. Fluid Mechanics 3. Thermodynamic 4. Combustion and Fuels	3
ESN0400 ESN0412	1. Electrical machines and devices 2. Turbomachinery	4
ESN0642 (ESN0643) ESN0523 ESN0331 ESN0075 (ESN0078)	1. Basics of Machine Design II 2. Power Engineering Metrology 3. Utility Boilers 4. Refrigeration and Cryogenics	5
ESN0136 ESN0891	1. Power and Heat Stations 2. Power Distribution	6

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

Semester	Allowable deficit of ECTS points after semester
1	15
2	17
3	14
4	12
5	12
6	0