

PLAN OF STUDY

FACULTY: MECHANICAL AND POWER ENGINEERING

MAIN FIELD OF STUDY: MECHANICAL ENGINEERING AND MACHINE BUILDING

EDUCATION LEVEL: 2nd level, Master of Science

FORM OF STUDIES: full-time

PROFILE: general academic

SPECIALIZATION: **REFRIGERATION AND CRYOGENICS**

LANGUAGE OF STUDY: english

Faculty Council Resolution of 20.09.2017
In effect since 01.10.2017

Plan of studies structure in point layout

30			
29		Master	
28		individual	
27		student	
26		project	
25			
24			Master
23			thesis
22			
21			
20			
19			
18			
17			
16			
15			
14			
13			
12			
11			
10			Master
9			seminar
8			
7		Modelling and	
6		optimization	
5			Marketing and
4			management
3	Mechanics	Management course	
2	analytical	Foreign	Humanities
1	Foreign language	language	course
	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 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			university-wide ⁴	practical ⁵	kind ⁶	type ⁷
1	MSN0463	Mechanics Analytical	2					K2MBM_W03	30	60	2	1	T	Z			K	Ob
2	MSN1362	Modern Engineering Materials	1					K2MBM_W02	15	30	1	0.5	T	Z			K	Ob
3	MSN1362	Modern Engineering Materials			1			K2MBM_U02	15	30	1	0.75	T	Z		P	K	Ob
4	MSN1362	Modern Engineering Materials				1		K2MBM_U06	15	30	1	0.75	T	Z		P	K	Ob
5	MSN0531	Mechatronics and Control Systems	2					K2MBM_W01	30	90	3	1.5	T	E			K	Ob
6	MSN0531	Mechatronics and Control Systems			2			K2MBM_U01	30	60	2	1.5	T	Z		P	K	Ob
Total			5		3		1		135	300	10	6						

Optional courses (minimum 300 hours in semester) 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			university-wide ⁴	practical ⁵	kind ⁶	type ⁷
1	JZL100709	Foreign Language (continuation), level B+		1				K2MBM_U08	15	30	1	0.75	T	Z	O	P	KO	W
2	MSN1225	Thermodynamic Fundamentals of Refrigeration, Cryogenics and Low Temperature Physics	2					S2RAC_W01	30	60	2	1	T	Z			S	W
3	MSN1225	Thermodynamic Fundamentals of Refrigeration, Cryogenics and Low Temperature Physics				1		S2RAC_U01	15	30	1	0.75	T	Z		P	S	W
4	MSN0161	Compressor Refrigeration Systems	2					S2RAC_W02	30	60	2	1	T	E			S	W
5	MSN0161	Compressor Refrigeration Systems		2				S2RAC_U02	30	60	2	1.5	T	Z		P	S	W
6	MSN0161	Compressor Refrigeration Systems			2			S2RAC_U03	30	60	2	1.5	T	Z		P	S	W
7	MSN0183	Refrigerants and Coolants	1					S2RAC_W03	15	30	1	0.5	T	Z			S	W

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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

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
8	MSN0831	Heat Pumps	1					S2RAC_W04	15	30	1	0.5	T	Z			S	W
9	MSN0831	Heat Pumps				1		S2RAC_U04	15	30	1	0.75	T	Z		P	S	W
10	MSN1051	Air-condition Systems	1					S2RAC_W05	15	30	1	0.5	T	Z			S	W
11	MSN0341	Cryogenics	2					S2RAC_W06	30	60	2	1	T	E			S	W
12	MSN0341	Cryogenics		1				S2RAC_U05	15	30	1	0.75	T	Z		P	S	W
13	MSN0341	Cryogenics			2			S2RAC_U06	30	60	2	1.5	T	Z		P	S	W
14	MSN0342	Cryogenic Materials and Fluids	1					S2RAC_W07	15	30	1	0.5	T	Z			S	W
Total			10	4	4	1	1		300	600	20	12.5						

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	4	7	1	2	435	900	30	18.5

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	MSN0614	Modelling and Optimisation	1					K2MBM_W04	15	60	2	1	T	E			PD	Ob
2	MSN0614	Modelling and Optimisation		2				K2MBM_U03	30	90	3	2.25	T	Z		P	PD	Ob
3	MSN1493	Integrated Production Systems	2					K2MBM_W06	30	60	2	1	T	Z			K	Ob
4	MSN1493	Integrated Production Systems			1			K2MBM_U05	15	30	1	0.75	T	Z		P	K	Ob
Total			3	2	1				90	240	8	5						

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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	JZL100710BK	Foreign Language (second), any level		3				K2MBM_U09	45	60	2	1.5	T	Z	O	P	KO	W
2	ZSN100500BK	Management Course	1					K2MBM_W08 K2MBM_K05	15	30	1	0.5	T	Z	O		KO	W
3	MSN1041	Cooling Systems and Refrigeration Plants	1					S2RAC_W08	15	30	1	0.5	T	Z			S	W
4	MSN1041	Cooling Systems and Refrigeration Plants				2		S2RAC_U07	30	60	2	1.5	T	Z		P	S	W
5	MSN0121	Absorption Refrigeration	2					S2RAC_W09	30	60	2	1	T	E			S	W
6	MSN0121	Absorption Refrigeration		1				S2RAC_U08	15	30	1	0.75	T	Z		P	S	W
7	MSN0121	Absorption Refrigeration				1		S2RAC_U09	15	30	1	0.75	T	Z		P	S	W
8	MSN1151	Gas and Cryogenic Technologies	2					S2RAC_W10	30	60	2	1	T	Z			S	W
9	MSN1151	Gas and Cryogenic Technologies				2		S2RAC_U10	30	60	2	1.5	T	Z		P	S	W
10	MSN0035	Applied Superconductivity	1					S2RAC_W11	15	30	1	0.5	T	Z			S	W
11	MSN0343	Cryogenic Systems	1					S2RAC_W12	15	30	1	0.5	T	Z			S	W
12	MSN0245	Introduction to Numerical Flow Phenomena Analysis			1			S2RAC_U11	15	30	1	0.75	T	Z		P	S	W
13	MSN1535	Master Individual Student Project				4		K2MBM_U07 K2MBM_K01 K2MBM_K04 K2MBM_K05	60	150	5	1	T	Z		P	K	W
Total			8	4	1	9			330	660	22	11,75						

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				
11	6	2	9		420	900	30	16.75

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Semester 3

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			universit y-wide ⁴	practical ⁵	kind ⁶	type ⁷
1	ZMZ0135	Marketing and Management	2					K2ENG_W07	30	90	3	1.5	T	Z			KO	Ob
2	MSN0034	Failure Analysis of Machines and Devices	2					K2MBM_W05 K2MBM_K05	30	60	2	1	T	Z			K	Ob
3	MSN0034	Failure Analysis of Machines and Devices			1			K2MBM_U04	15	30	1	0.75	T	Z		P	K	Ob
4	MSN1561	Diploma Seminar					2	K2MBM_U06 K2MBM_U07 K2MBM_K01 K2MBM_K03 K2MBM_K04 K2MBM_K05	30	60	2	1.5	T	Z		P	K	Ob
Total			4		1		2		105	240	8	4.75						

Optional courses (minimum 15 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	HSN100500BK	Humanities Course	1					K2MBM_W07 K2MBM_K02 K2MBM_K06	15	60	2	1	T	Z	O		KO	W
2	MSN1612	Master Thesis						K2MBM_U07 K2MBM_K01 K2MBM_K04 K2MBM_K05		600	20	4	T	Z		P	K	W
Total			1						15	660	22	5						

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

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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				
5		1		2	120	900	30	9.75

2. Set of examinations in semestral arrangement

Course code	Names of courses ending with examination	Semester
MSN0531	1. Mechatronics and Control Systems	1
MSN0161	2. Compressor Refrigeration Systems	
MSN0341	3. Cryogenics	
MSN0614	1. Modelling and Optimisation	2
MSN0121	2. Absorption Refrigeration	

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

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