

V. EDUCATION PROCESS PLAN

Code in accordance with the EP	Name of academic discipline	Semester distribution			Number of ECTS credits	Number of hours						Distribution of classroom hours per a week and ECTS credits per a semester																Department	
		Exams	Tests	Individual tasks		Total amount	Classroom			Independent work	I course				II course				III course				IV course						
							Total	including			Semesters																		
		Lectures	Laboratory works	Practical studies		1		2	3	4	5	6	7	8	Number of weeks in the semester														
		20		20		20		20		20		20		20		20		20		20		20							
		Classroom hours	ECTS credits	Classroom hours		ECTS credits	Classroom hours	ECTS credits	Classroom hours	ECTS credits	Classroom hours	ECTS credits	Classroom hours	ECTS credits	Classroom hours	ECTS credits	Classroom hours	ECTS credits	Classroom hours	ECTS credits	Classroom hours	ECTS credits	Classroom hours	ECTS credits					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
1	Obligatory educational components				166,0	4980,0	2128,0	876,0	340,0	912,0	2852,0	26,0	27,0	29,0	30,0	20,0	24,0	23,0	24,0	13,0	15,0	17,0	8,0	11,0	2,0	2,0	14,0		
1.1	General training				76,0	2280,0	1088,0	344,0	128,0	616,0	1192,0	17,0	18,0	23,0	24,0	11,0	14,0	8,0	9,0	2,0	2,0	5,0	5,0	2,0	2,0	2,0	2,0		
GT 1	Vocational Language	2	1		9,0	270,0	128,0			128,0	142,0	4,0	5,0	4,0	4,0													273	
GT 2	Foreign Language		7-8		4,0	120,0	52,0			52,0	68,0													2,0	2,0	2,0	2,0	275	
GT 3	Ukrainian as a foreign language		3-6		10,0	300,0	120,0			120,0	180,0					2,0	4,0	2,0	2,0	2,0	2,0	2,0	2,0					273	
GT 4	Higher Mathematics p.1	1		C	6,0	180,0	96,0	48,0		48,0	84,0	6,0	6,0															155	
	Higher Mathematics p.2	2		C	6,0	180,0	96,0	48,0		48,0	84,0			6,0	6,0														155
	Higher Mathematics p.3	3		C	4,0	120,0	64,0	32,0		32,0	56,0				4,0	4,0													155
	Higher Mathematics p.4	4		C	3,0	90,0	48,0	32,0		16,0	42,0					3,0	3,0												155
GT 5	Physics p.1	1		C	5,0	150,0	80,0	32,0	32,0	16,0	70,0	5,0	5,0																168
	Physics p.2	2		C	5,0	150,0	80,0	32,0	32,0	16,0	70,0				5,0	5,0													168
	Physics p.3	3		C	3,0	90,0	48,0	16,0	16,0	16,0	42,0					3,0	3,0												168
GT 6	Chemistry	2		C	4,0	120,0	64,0	32,0	32,0		56,0				4,0	4,0													192
GT 7	Ecology		2	R	3,0	90,0	32,0	16,0	16,0		58,0				2,0	3,0													144
GT 8	Philosophy	3		R	3,0	90,0	32,0	16,0		16,0	58,0					2,0	3,0												307
GT 9	History and Culture of Ukraine	4		R	4,0	120,0	48,0	16,0		32,0	72,0							3,0	4,0										310
GT 10	Jurisprudence		6	R	3,0	90,0	36,0	24,0		12,0	54,0											3,0	3,0						306
GT	Physical education		1 - 2		4,0	120,0	64,0			64,0	56,0	2,0	2,0	2,0	2,0														302
1.2	Professional training				90,0	2700,0	1040,0	532,0	212,0	296,0	1660,0	9,0	9,0	6,0	6,0	9,0	10,0	15,0	15,0	11,0	13,0	12,0	16,0	6,0	9,0		12,0		
PT 1	Descriptive Geometry, Engineering and	1		CG	6,0	180,0	96,0	32,0		64,0	84,0	6,0	6,0																163
PT 2	Fundamentals of Informatics	1		C	3,0	90,0	48,0	16,0	16,0	16,0	42,0	3,0	3,0																140
PT 3	Theoretical Mechanics. part 1		2	CG	3,0	90,0	48,0	32,0		16,0	42,0				3,0	3,0													166
	Theoretical Mechanics. part 2	3		CG	4,0	120,0	64,0	32,0		32,0	56,0					4,0	4,0												166
PT 4	Fundamentals of CAD	2		CG	3,0	90,0	48,0	16,0	16,0	16,0	42,0				3,0	3,0													140
PT 5	Technology of Construction Materials and Materials Science	3		C	6,0	180,0	80,0	48,0	32,0		100,0				5,0	6,0													143
PT 6	Theory of Mechanisms and Machines, part 1	4		C	3,0	90,0	48,0	32,0		16,0	42,0						3,0	3,0											151
	Theory of Mechanisms and Machines, part 2	5		CP	6,0	180,0	80,0	48,0	16,0	16,0	100,0								5,0	6,0									151
PT 7	Strength of Materials. part 1		4	C	5,0	150,0	80,0	48,0	16,0	16,0	70,0					5,0	5,0												166
	Strength of Materials, part 2	5		C	3,0	90,0	48,0	16,0	16,0	16,0	42,0								3,0	3,0									166
PT 8	Interchangeability, standardization and technical measurements in mechanical engineering	4		C	4,0	120,0	64,0	32,0	16,0	16,0	56,0					4,0	4,0												147
PT 9	Numerical Methods and Basics of		4	C	3,0	90,0	48,0	16,0	16,0	16,0	42,0					3,0	3,0												140
PT 10	Machine Parts, part 1	5		CG	4,0	120,0	48,0	32,0	16,0		72,0								3,0	4,0									148
	Machine Parts, part 2	6		CP	4,0	120,0	48,0	24,0	12,0	12,0	72,0											4,0	4,0						148
PT 11	Fundamentals of Mechanical Engineering Technology	6		CG	3,0	90,0	48,0	36,0	12,0		42,0											4,0	3,0						146
PT 12	Fundamentals of Automatic Control	6		C	3,0	90,0	48,0	24,0	12,0	12,0	42,0											4,0	3,0						140

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
PT 13	Fundamentals of Occupational Safety and Health	7		C	3,0	90,0	32,0	16,0	16,0		58,0													2,0	3,0			144
PT 14	History of Science and Technology		7	R	3,0	90,0	32,0	16,0		16,0	58,0													2,0	3,0			310
PT 15	Enterprise Economy		7	P	3,0	90,0	32,0	16,0		16,0	58,0													2,0	3,0			202
PT	Practical Training*		6		6,0	180,0					180,0												6,0					140
PT	Pre-graduation Practice*		8		6,0	180,0					180,0															6,0		140
	Attestation*				6,0	180,0					180,0																6,0	140
2	Optional educational components				74,0	2220,0	980,0	248,0	152,0	106,0	1240,0	2,0	3,0			6,0	6,0	5,0	6,0	13,0	15,0	9,0	9,0	16,0	19,0	20,0	16,0	
2.1	Profile training				36,0	1080,0	506,0	248,0	152,0	106,0	574,0	2,0	3,0			6,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	4,0	
2.1.1	Discipline block 01 "Automobiles and Tractors"				36,0	1080,0	506,0	248,0	152,0	106,0	574,0	2,0	3,0			6,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	4,0	
OP1.1	Entry into the Specialty. Introductory Practice		1	R	3,0	90,0	32,0	32,0			58,0	2,0	3,0															152
OP1.2	The Construction of Automobiles and Tractors and their Analysis. p.1		3	CW	6,0	180,0	96,0	48,0	32,0	16,0	84,0					6,0	6,0											152
	The Construction of Automobiles and Tractors and their Analysis. p.2		4		CW	6,0	180,0	80,0	32,0	32,0	100,0							5,0	6,0									152
OP1.3	Theory and Design of Automobiles and Tractors. p.1		5		CG	6,0	180,0	96,0	48,0	32,0	84,0									6,0	6,0							152
	Theory and Design of Automobiles and Tractors. p.2		6		CG	6,0	180,0	72,0	36,0	24,0	108,0											6,0	6,0					152
OP1.4	Production Technology of Automobiles and Tractors		7		CP	5,0	150,0	80,0	32,0	32,0	70,0													5,0	5,0			152
OP1.5	Vibrations and vibration protection in the car and tractor construction		8			4,0	120,0	50,0	20,0		30,0	70,0														5,0	4,0	152
2.1.2	Discipline block 02 "Automated Design of All Terrain Vehicles"				36,0	1080,0	506,0	286,0	96,0	124,0	574,0	2,0	3,0			6,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	4,0	
OP2.1	Entry into the Specialty. Introductory Practice		1	R	3,0	90,0	32,0	32,0			58,0	2,0	3,0															153
OP2.2	Object-oriented Programming		3		CW	6,0	180,0	96,0	32,0	48,0	84,0					6,0	6,0											153
OP2.3	The Construction of All Terrain Vehicles (ATV)		4		R	6,0	180,0	80,0	48,0	32,0	100,0							5,0	6,0									153
OP2.4	The Theory of ATV		5		CG	6,0	180,0	96,0	48,0	16,0	84,0									6,0	6,0							153
OP2.5	Design and Calculation of ATV		6		CG	6,0	180,0	72,0	48,0		108,0											6,0	6,0					153
OP2.6	Design and Calculation of Military Tracked and Wheeled Vehicles (MTWV), part 1		7		R	5,0	150,0	80,0	48,0		32,0	70,0												5,0	5,0			153
	Design and Calculation of MTWV, part 2		8			4,0	120,0	50,0	30,0		20,0	70,0														5,0	4,0	153
2.1.3	Discipline block 03 "Machines and Mechanisms of Oil and Gas Industry"				36,0	1080,0	506,0	350,0	64,0	92,0	574,0	2,0	3,0			6,0	6,0	5,0	6,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	4,0	
OP3.1	Entry into the Specialty. Introductory Practice		1	R	3,0	90,0	32,0	32,0			58,0	2,0	3,0															150
OP3.2	Information Technologies and Programming		3		CW	6,0	180,0	96,0	64,0	32,0	84,0					6,0	6,0											150
OP3.3	Hydraulics, Hydraulic and Pneumatic		4		CW	6,0	180,0	80,0	48,0	16,0	100,0							5,0	6,0									150
OP3.4	Mechanics of Viscous Fluid and Drilling Fluids		5		CG	6,0	180,0	96,0	64,0	16,0	84,0									6,0	6,0							150
OP3.5	Machines and Equipment for Drilling Oil and Gas Wells		6		CG	6,0	180,0	72,0	48,0		24,0	108,0										6,0	6,0					150
OP3.6	Machines and Equipment for Oil and other Hydrocarbons Mining, part 1		7		CW	5,0	150,0	80,0	64,0		16,0	70,0												5,0	5,0			150

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	Machines and Equipment for Oil and other Hydrocarbons Mining, part 2	8			4,0	120,0	50,0	30,0		20,0	70,0															5,0	4,0	150
2.1.4	Discipline block 04 "Lifting-and-Shifting, Road, Building, Land-Reclamation Machines and Equipment"				36,0	1080,0	506,0	230,0	236,0	40,0	574,0	2,0	3,0				6,0	6,0	5,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	4,0	
OP4.1	Entry into the Specialty. Introductory Practice		1	R	3,0	90,0	32,0	32,0			58,0	2,0	3,0															149
OP4.2	Object-oriented Programming		3	CW	6,0	180,0	96,0	32,0	48,0	16,0	84,0					6,0	6,0											149
OP4.3	Microcontrollers in Lifting, Transport and Storage Systems	4		РГ	6,0	180,0	80,0	32,0	48,0		100,0							5,0	6,0									149
OP4.4	Calculations and Modeling in Lifting-and-Shifting Machines (LSM)	5		РГ	6,0	180,0	96,0	32,0	64,0		84,0									6,0	6,0							149
OP4.5	Constructive Elements of Warehouses	6		РГ	6,0	180,0	72,0	24,0	24,0	24,0	108,0											6,0	6,0					149
OP4.6	Lifting Machines and Technical Means of Logistics, part 1	7		КП	5,0	150,0	80,0	48,0	32,0		70,0														5,0	5,0		149
	Lifting Machines and Technical Means of Logistics, part 2	8			4,0	120,0	50,0	30,0	20,0		70,0															5,0	4,0	149
2.1.5	Discipline block 05 "Equipment for Food, Processing and Chemical Production"				36,0	1080,0	506,0	254,0	74,0	178,0	574,0	2,0	3,0				6,0	6,0	5,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	4,0	
OP5.1	Entry into the Specialty. Introductory Practice		1	R	3,0	90,0	32,0	16,0		16,0	58,0	2,0	3,0															154
OP5.2	Fundamentals of Chemical Thermodynamics and Heat Engineering		3	CW	6,0	180,0	96,0	48,0		48,0	84,0					6,0	6,0											154
OP5.3	Processes and Apparatuses of Chemical Technology, part 1	4		CP	6,0	180,0	80,0	32,0	32,0	16,0	100,0							5,0	6,0									154
	Processes and Apparatuses of Chemical Technology, part 2	5		C	6,0	180,0	96,0	32,0	32,0	32,0	84,0									6,0	6,0							191
OP5.4	Technological Equipments of Chemical Production	6		CG	6,0	180,0	72,0	48,0		24,0	108,0											6,0	6,0					191
OP5.5	Technological Equipments of Processing and Food Production	7		CP	5,0	150,0	80,0	48,0		32,0	70,0														5,0	5,0		154
OP5.6	Calculation and Construction of Machines and Apparatuses in Food, Processing and Chemical Industrials	8			4,0	120,0	50,0	30,0	10,0	10,0	70,0															5,0	4,0	154
2.1.8	Profiled discipline package 08 "Automated and robotic complexes in mechanical engineering."				36,0	1080,0	506,0	286,0	102,0	118,0	574,0	2,0	3,0				6,0	6,0	5,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	4,0	
OP8.1	Entry into the Specialty. Introductory Practice		1	R	3,0	90,0	32,0	32,0			58,0	2,0	3,0															146
OP8.2	Microprocessor and Software Automation		3	CW	6,0	180,0	96,0	48,0	32,0	16,0	84,0					6,0	6,0											146
OP8.3	Computer Technologies in Engineering	4		R	6,0	180,0	80,0	32,0	32,0	16,0	100,0							5,0	6,0									146
OP8.4	Fundamentals of Automation Systems Design	5		CG	6,0	180,0	96,0	48,0	16,0	32,0	84,0									6,0	6,0							146
OP8.5	Automated Metal-Cutting Equipment and Robotic Systems in Mechanical Engineering	6		CG	6,0	180,0	72,0	48,0	12,0	12,0	108,0											6,0	6,0					146
OP8.6	Technology of Automated Machine-building Production	7		CP	5,0	150,0	80,0	48,0		32,0	70,0														5,0	5,0		146

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
OP8.7	High Technologies in Mechanical Engineering	8			4,0	120,0	50,0	30,0	10,0	10,0	70,0															5,0	4,0	146	
2.1.9	Discipline block 09 "Mechatronic Systems of Vehicles"				36,0	1080,0	506,0	286,0	148,0	72,0	574,0	2,0	3,0				6,0	6,0	5,0	6,0	6,0	6,0	6,0	5,0	5,0	5,0	4,0		
OP9.1	Entry into the Specialty. Introductory Practice		1	R	3,0	90,0	32,0	32,0			58,0	2,0	3,0															153	
OP9.2	Object-oriented Programming		3	CW	6,0	180,0	96,0	32,0	48,0	16,0	84,0					6,0	6,0											153	
OP9.3	The Construction of Vehicles	4		R	6,0	180,0	80,0	48,0	32,0		100,0							5,0	6,0									153	
OP9.4	The Theory of Vehicles	5		CG	6,0	180,0	96,0	48,0	16,0	32,0	84,0									6,0	6,0							153	
	Mechatronic Systems Components, part 1	6		CG	6,0	180,0	72,0	48,0		24,0	108,0											6,0	6,0					153	
OP9.5	Design and Calculation of Vehicles, part 1	7		CP	5,0	150,0	80,0	48,0	32,0		70,0													5,0	5,0			153	
OP9.6	Design and Calculation of Vehicles, part 2	8			4,0	120,0	50,0	30,0	20,0		70,0															5,0	4,0	153	
2.2	Optional student disciplines of the profile preparation according to the list				27,0	810,0	342,0				468,0									4,0	5,0			8,0	10,0	15,0	12,0	140	
2.3	Optional student disciplines from the general university catalog of disciplines				11,0	330,0	132,0				198,0									3,0	4,0	3,0	3,0	3,0	4,0				
OD1	Discipline 1		5		4,0	120,0	48,0				72,0									3,0	4,0								
OD2	Discipline 2		6		3,0	90,0	36,0				54,0											3,0	3,0						
OD3	Discipline 3		7		4,0	120,0	48,0				72,0														3,0	4,0			
Total for education period					240,0	7200,0	3108,0				4092,0	28,0	30,0	29,0	30,0	26,0	30,0	28,0	30,0	26,0	30,0	26,0	30,0	24,0	30,0	22,0	30,0		
Hours per week												28,0	29,0	26,0	28,0	26,0	26,0	24,0	22,0										
Number of exams												4	5	5	5	4(+1)	4	2(+2)	1(+3)										
Number of tests												3	3	2	3	2	4	4	2										
Number of course projects (works)														1	1	1	1	1											
Numbers of disciplines per semester												7	8	7	8	7	8	8	6										

Individual tasks	
C	Calculated task
CG	Calculated and graphic task
R	Report
CP	Course project
CW	Course work

Approved by the Academic Council of NTU "KhPI"
 PROTOCOL №4 from 27 of april 2022

Vice-rector of Scientific-and-Pedagogical Work

 Signature Full name
 Gennadii KHRYPUNOV

Head of the educational program
 Sectoral engineering

 Signature Full name
 Iryna TYNIAKOVA

Director of the Director of Education and
 Science Institute of Mechanical Engineering
 and Transport

name of the Institute

 Signature Full name
 Vitalii IEPIFANOV

Head of the Department of Automotive
 and Tractor Engineering

name of department

 Signature Full name
 Oleksii REBROV

Head of the Department of Information
 Technologies and Systems of Wheeled and
 Tracked Vehicles named after A. Morozov

name of department

 Signature Full name
 Dmytro VOLONTSEVYCH

Head of the Department of Hydraulic
 Machines named after G.F. Proskura

name of department

 Signature Full name
 Andrii ROGOVYI

Head of the Department "Lifting and transport
 machines and equipment"

 Signature Full name
 Valentyn KOVALENKO

Head of the Department of Chemical
 engineering and industrial ecology

 Signature Full name
 Oleksii SHESTOPALOV

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
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name of department

Signature

Full name

name of department

Signature

Full name

**Head of the Department of Mechanical
Engineering Technology and Metal-Cutting
Machines**

name of department

Oleksandr PERMYAKOV

Signature

Full name

* Practices and attestations are carried out by graduating

List of optional student disciplines of the profile training

Code in accordance with the EPT	Name of academic discipline	Semester distribution			Number of ECTS credits	Number of hours						Distribution of classroom hours per a week and ECTS credits per a semester																Department	
		Exams	Tests	Individual tasks		Total amount	Classroom				Independent work	I course		II course		III course		IV course											
							Total	including				1	2	3	4	5	6	7	8										
		Lectures	Laboratory works	Practical studies		Semesters																							
		Number of weeks in the semester																											
		20		20		20		20		20		20		20		20													
Classroom m hours	ECTS credits	Classroom m hours	ECTS credits	Classroom m hours	ECTS credits	Classroom m hours	ECTS credits	Classroom m hours	ECTS credits	Classroom m hours	ECTS credits	Classroom m hours	ECTS credits	Classroom m hours	ECTS credits														
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
2.2	Optional student disciplines of the profile training																												
OPT1	Numerical Calculation Methods for Cars and Tractors	5		CG	5,0	150,0	64,0	16,0	32,0	16,0	86,0									4,0	5,0								152
OPT2	Electrical Engineering, Electronics and Microprocessor Technology	5		C	5,0	150,0	64,0	32,0	16,0	16,0	86,0									4,0	5,0								153
OPT3	Fundamentals of Underground Hydraulics and Filtration Theory	5		CG	5,0	150,0	64,0	48,0		16,0	86,0									4,0	5,0								150
OPT4	Components of Electromechanical Systems in Lifting and Transport Machines (LTM)	5		C	5,0	150,0	64,0	32,0	32,0		86,0									4,0	5,0								149
OPT5	Safety of Food and Foodstuffs	5		C	5,0	150,0	64,0	32,0		32,0	86,0									4,0	5,0								154
OPT6	Measurement Technology and Instruments	5		C	5,0	150,0	64,0	32,0	16,0	16,0	86,0									4,0	5,0								146
OPT7	Theoretical Foundations of Electrical Engineering	5		C	5,0	150,0	64,0	32,0	16,0	16,0	86,0									4,0	5,0								137
OPT8	Mathematical Models and Basics of Automation for Cars and Tractors	7		CG	5,0	150,0	64,0	32,0		32,0	86,0												4,0	5,0				152	
OPT9	Electrohydraulic and Pneumatic Systems for Cars and Tractors	7		C	5,0	150,0	64,0	32,0	32,0		86,0												4,0	5,0				152	
OPT10	CAD of All Terrain Vehicles (ATV)	7		CG	5,0	150,0	64,0	32,0	32,0		86,0												4,0	5,0				153	
OPT11	Special Systems of Military Tracked and Wheeled Vehicles (MTWV)	7		R	5,0	150,0	64,0	48,0	16,0		86,0												4,0	5,0				153	
OPT12	Hydraulic and Pneumatic Superchargers	7		CG	5,0	150,0	64,0	48,0		16,0	86,0												4,0	5,0				150	
OPT13	Fundamentals of the Theory of Hydraulic Machines Workflow	7		CG	5,0	150,0	64,0	48,0		16,0	86,0												4,0	5,0				150	
OPT14	Means of Small Mechanization	7		CG	5,0	150,0	64,0	32,0	32,0		86,0												4,0	5,0				149	
OPT15	SMART-technologies in Mechanical Engineering	7		CG	5,0	150,0	64,0	32,0	32,0		86,0												4,0	5,0				149	
OPT16	Basics of Manufacturing Equipment for Chemical and Food Industries	7		CG	5,0	150,0	64,0	48,0		16,0	86,0												4,0	5,0				154	
OPT17	Design of Industrial Facilities Using CAD	7		CG	5,0	150,0	64,0	32,0	16,0	16,0	86,0												4,0	5,0				154	
OPT18	Automated Electric Drive	7		C	5,0	150,0	64,0	32,0	16,0	16,0	86,0												4,0	5,0				146	
OPT19	Fundamentals of Engineering Creativity	7		R	5,0	150,0	64,0	32,0	16,0	16,0	86,0												4,0	5,0				146	
OPT20	Mechatronic Systems Components, part 2	7		R	5,0	150,0	64,0	48,0	16,0		86,0												4,0	5,0				153	
OPT21	Development Tools for Microprocessor Devices of Mechatronic Systems, part 1	7		C	5,0	150,0	64,0	48,0	16,0		86,0												4,0	5,0				153	
OPT22	CAD in Car and Tractor Construction	8			4,0	120,0	50,0	20,0	30,0		70,0															5,0	4,0	152	
OPT23	Fundamentals of Optimization in Car and Tractor Designs	8			4,0	120,0	50,0	30,0		20,0	70,0															5,0	4,0	152	

