



MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL TECHNICAL UNIVERSITY "KHARKIV POLYTECHNIC INSTITUTE"

CURRICULUM

educational and professional program

Electrical Power Engineering

APPROVED BY

Rector of NTU "KhPI" Yevegen SOKOL for the training

second (master's) level in the field of 12 Information Technologies
(higher education level) knowledge (Knowledge field code and title)

[Handwritten Signature]



Yevegen SOKOL by specialty

- 122 Computer Science

Qualification Master of Computer Science

Period of study 1 year 4 months

on the basis of bachelor's degree

"02 06 2023"

Form of study full-time

I. Schedule of Education Process

Course	September				October				November				December				January				February				March				April				May				June				July				August										
	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	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52			
1	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	V	E	E	E	V	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	E	E	E	V	V	V	V	V	V	V	V	V	V	V	V	
2	P	P	P	P	P	P	P	P	Q	Q	Q	Q	Q	Q	D	D																																							

Legend: **T** Theoretical study **E** Exam Session **P** Practice **Q** Preparation of qualification work **T** Test week **V** Vacation **D** Defending of qualification work

II. Consolidated budget time (in weeks)

Course	Theoretical study	Exam Session	Practice	Attestation	Preparation of qualification project (work)	Vacation	Total
1	32	8				12	52
2			8	2	6		16
total	32	8	8	2	6	12	68

III. Practice

Type of practice	Duration (in weeks)	Semester
Prediploma	8	3

IV. Attestation

Measures	Number of ECTS credits	Semester
Preparation of qualification work	11,0	3
Defending of qualification work	4,0	3
Proficiency examination		

CONTENT of CURRICULUM

for the master's training:

by specialty

122

Computer Science

Number in order	Discipline title	Total amount				Department code
		ECTS credits	Hours	Semesters		
				Exam	Test	
1	2	3	4	5	6	7
1	Obligatory educational components	33,0	990,0			37%
1.1	General training	9,0	270,0			10%
GT 1	Innovative Entrepreneurship and Management of Startup Projects	3,0	90,0		1	202
GT 2	Foreign Language for Professional Purposes	3,0	90,0		1	275
GT 3	Intellectual Property	3,0	90,0		2	202
1.2	Professional training	24,0	720,0			27%
PT 1	Fundamentals of Scientific Research	3,0	90,0		1	162
PT 2	Modern methods of mathematical and computer modeling	5,0	150,0	1		161
PT 3	NO SQL databases	5,0	150,0	1		162
PT 4	Algorithms and models of data collection, analysis and visualization	4,0	120,0	2		161
PT 5	Efficiency and quality of architectural solutions of information systems	4,0	120,0	2		162
PT 6	Project work	3,0	90,0		2	161,162
2	Practical training	15,0	450,0			17%
PP 1	Pre-graduation practice*	15,0	450,0		3	161,162
3	Attestation*	15,0	450,0	3		17%
4	Optional educational component	27,0	810,0			30%
4.1	Profile training	19,0	570,0			21%
4.1.1	Profiled discipline package 01 "Modeling and AI-Driven Systems Development for Robotics and Engineering"	19,0	570,0			
OP 1.1	Theory and algorithms of computer simulations	4,0	120,0	1		161
OP 1.2	Motion control methods for robotic systems	3,0	90,0	1		162
OP 1.3	Modelling of objects and processes in CAD/CAE systems	4,0	120,0	2		161
OP 1.4	Methods of artificial intelligence in control algorithms	4,0	120,0	2		162
OP 1.5	Hardware and software for UAV and robot's development	4,0	120,0	2		162
4.1.2	Profiled discipline package 02 "Design, Development and Analysis of Computer Systems"	19,0	570,0			
OP 2.1	Methods of computing experiment	4,0	120,0	1		162
OP 2.2	Stack of technologies for designing Web applications	3,0	90,0	1		162
OP 2.3	Development of applications using .NET	4,0	120,0	2		162
OP 2.4	IT project management	4,0	120,0	2		162
OP 2.5	Technologies and tools of DevOps practitioners	4,0	120,0	2		162
4.1.3	Profiled discipline package 03 "Technologies of augmented reality"	19,0	570,0			
OP 3.1	Recognition systems for augmented reality	4,0	120,0	1		169
OP 3.2	Spatial Intelligence Infocommunications	3,0	90,0	1		169
OP 3.3	Artificial intelligence methods for image synthesis	4,0	120,0	2		169
OP 3.4	Decision support systems in augmented reality	4,0	120,0	2		169
OP 3.5	Applications coding for 3D topology	4,0	120,0	2		169
4.2	Optional student disciplines of the profile preparation according to the list (the list is attached)	8,0	240,0		1,2	9%
	Total for education period	90,0	2700,0			

List of optional student disciplines of the profile training

Code in accordance with the EPP	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	1 course		2 course		Classroom hours	ECTS credits	Classroom hours		ECTS credits	Classroom hours	ECTS credits
							Total	including			Semesters		Semester								
		Lectures	Laboratory works	Practical studies		20		20	16	1	2	3									
							Number of weeks in the semester														
		1	2	3		4	5	6	7	8	9	10	11	12	13	14	15		16	17	18
4.2	Optional student disciplines of the profile training																				
OPT 1	Development and use of neural networks		1	R	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0					161			
OPT 2	Algorithms and software development for parallel and distributed computations		1	R	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0					161			
OPT 3	Distributed systems and knowledge bases		1	R	4,0	120,0	48,0	16,0	32,0		72,0	3,0	4,0					169			
OPT 3	Methods and algorithms of decision making		2	R	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			162			
OPT 4	Development of complex applications by use of		2	R	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			162			
OPT 6	Technologies of spatial intelligence		2	R	4,0	120,0	48,0	16,0	32,0		72,0			3,0	4,0			169			

V. EDUCATION PROCESS PLAN

Code in accordance with the EPP	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	Total	Classroom			Independent work	1 course		2 course				
								Lectures	Laboratory works	Practical studies		Semesters		Semester				
		including		1								2	Number of weeks in the semester					
		20		20		16												
		Classroom hours	ECTS credits	Classroom hours		ECTS credits	Classroom hours	ECTS credits										
13	14	15	16	17	18													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	29
1	Obligatory educational components				33,0	990,0	352,0	160,0	112,0	80,0	638,0	14,0	19,0	8,0	14,0			
1.1	General training				9,0	270,0	96,0	48,0		48,0	174,0	4,0	6,0	2,0	3,0			
GT 1	Innovative Entrepreneurship and Management of Startup Projects		1	R	3,0	90,0	32,0	16,0		16,0	58,0	2,0	3,0					202
GT 2	Foreign Language for Professional Purposes		1	R	3,0	90,0	32,0			32,0	58,0	2,0	3,0					275
GT 3	Intellectual Property		2	R	3,0	90,0	32,0	32,0			58,0			2,0	3,0			202
1.2	Professional training				24,0	720,0	256,0	112,0	112,0	32,0	464,0	10,0	13,0	6,0	11,0			
PT 1	Fundamentals of Scientific Research		1	CP	3,0	90,0	32,0			32,0	58,0	2,0	3,0					162
PT 2	Modern methods of mathematical and computer modeling	1		R	5,0	150,0	64,0	32,0	32,0		86,0	4,0	5,0					161
PT 3	NO SQL databases	1		R	5,0	150,0	64,0	32,0	32,0		86,0	4,0	5,0					162
PT 4	Algorithms and models of data collection, analysis and visualization	2		R	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			161
PT 5	Efficiency and quality of architectural solutions of information systems	2		R	4,0	120,0	48,0	16,0	32,0		72,0			3,0	4,0			162

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	29
PT 6	Project work		2		3,0	90,0					90,0				3,0			161,162
2	Practical training				15,0	450,0					450,0						15,0	
PP 1	Pre-graduation practice*		3		15,0	450,0					450,0						15,0	161,162
3	Attestation*	3			15,0	450,0					450,0						15,0	161,2
4	Optional educational component				27,0	810,0	320,0	144,0	176,0		490,0	8,0	11,0	12,0	16,0			
4.1	Profile training				19,0	570,0	224,0	112,0	112,0		346,0	5,0	7,0	9,0	12,0			
4.1.1	Profiled discipline package 01 "Modeling and AI-Driven Systems Development for Robotics and Engineering"				19,0	570,0	224,0	112,0	112,0		346,0	5,0	7,0	9,0	12,0			
OP 1.1	Theory and algorithms of computer simulations	1		R	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0					161
OP 1.2	Motion control methods for robotic systems	1		R	3,0	90,0	32,0	16,0	16,0		58,0	2,0	3,0					162
OP 1.3	Modelling of objects and processes in CAD/CAE systems	2		R	4,0	120,0	48,0	16,0	32,0		72,0			3,0	4,0			161
OP 1.4	Methods of artificial intelligence in control algorithms	2		R	4,0	120,0	48,0	16,0	32,0		72,0			3,0	4,0			162
OP 1.5	Hardware and software for UAV and robot's development	2		R	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			162
4.1.2	Profiled discipline package 02 "Design, Development and Analysis of Computer Systems"				19,0	570,0	224,0	112,0	112,0		346,0	5,0	7,0	9,0	12,0			
OP 2.1	Methods of computing experiment	1		R	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0					162
OP 2.2	Stack of technologies for designing Web applications	1		R	3,0	90,0	32,0	16,0	16,0		58,0	2,0	3,0					162
OP 2.3	Development of applications using .NET	2		R	4,0	120,0	48,0	16,0	32,0		72,0			3,0	4,0			162
OP 2.4	IT project management	2		R	4,0	120,0	48,0	16,0	32,0		72,0			3,0	4,0			162
OP 2.5	Technologies and tools of DevOps practitioners	2		R	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			162
4.1.3	Profiled discipline package 03 "Technologies of augmented reality"				19,0	570,0	224,0	112,0	64,0		346,0	5,0	7,0	9,0	12,0			
OP 3.1	Recognition systems for augmented reality	1		R	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0					169
OP 3.2	Spatial Intelligence Infocommunications	1		R	3,0	90,0	32,0	16,0	16,0		58,0	2,0	3,0					169
OP 3.3	Artificial intelligence methods for image synthesis	2		R	4,0	120,0	48,0	48,0			72,0			3,0	4,0			169
OP 3.4	Decision support systems in augmented reality	2		R	4,0	120,0	48,0	16,0	32,0		72,0			3,0	4,0			169
OP 3.5	Applications coding for 3D topology	2		R	4,0	120,0	48,0	32	16		72,0			3,0	4,0			169
4.2	Optional student disciplines of the profile preparation according to the list (the list is attached)		1,2	R	8,0	240,0	96,0	32,0	64,0		144,0	3,0	4,0	3,0	4,0			
	Total for education period				90,0	2700,0	672,0	304,0	288,0	80,0	2028,0	22,0	30,0	20,0	30,0			30,0

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	29
Hours per week												22,0	20,0					
Number of exams												5	5					
Number of tests												3	2					
Number of course projects (works)												1						
Numbers of disciplines per semester												8,0	7,0					

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 № 5 from 02.06.2023 p.

Vice-rector of Scientific-and-Pedagogical Work



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