

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

# **CURRICULUM**

# educational and professional program

### **Modern Programming, Mobile Devices and Computer Games**

for the Rector of NTU "KhPI" training by specialty

second (master's) level

(level of higher education)

in the field of knowledge

- 123

**Electrical engineering** 

**Computer Engineering** 

(code and name of the field of knowledge)

Qualification

**Master of Computer** 

Engineering

Period of study

1 рік 4 місяці

on the basis of

bachelor's degree

Form of study full-time

#### I. Schedule of the educational process

rse	S	epte	mbe	er	(	Octo	ber			No	vem	ber		D	есе	mb	er		J	anu	ary			Febr	uar	у		Ма	arch			Αp	oril			ı	<i>l</i> lay			Jı	une				Jul	у			Αu	ıgus	it
Cou	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 3	8 39	40	41	42	43		45	46	6 47	48	49	50	51	52
1																	S	С	С	С	٧	٧	٧																S	С	С	С	٧	٧	V	V	٧	٧	٧	٧	V
2					Р	Р	Р	Р	Р	Р	Р	S	Q	Q	Q	D	D																													T					

Notation:

Theoretical training S Score week E Examination session

**Q** Preparation of qualification work

**D** Defense of qualification work

**U** Unified state qualification exam

C Certification exam

**V** Vacations

## II. Consolidated budget time (in weeks)

Course	Theoretical study	Exam Session	Practice	Attestation	Preparation of qualification project (work)	Free time	Total
1	32	2				12	46
2	4	1	7	2	3		17
Total	36	3	7	2	3	12	63

#### III. Practice

Practice	Duration (in weeks)	Semester
Pre-diploma	7	3

#### IV. Attestation

Measures	Number of ECTS credits	Semester
Preparation of qualification work	7,0	3
•		
Defending of qualification work	4,0	3
Attestation Exam		
Proficiency examination		

#### **CURRICULUM CONTENT**

Master's degree program:

by specialty 123 Computer Engineering

	T	ı	Total numl	hor		
№ з/п	Name of the educational component				esters	Department
112 0/11	Traine of the educational compension	ECTS credits	Hours	exam.	offset	code
1	2	3	4	5	6	7
1	Mandatory educational components	40,0	1200,0			44%
1.1	General preparation	9,0	270,0			10%
GT 1	Foreign Language in Professional Field	3,0	90,0		1	275
GT 2	Innovative Entrepreneurship and Startup Project Management	3,0	90,0		1	202
GT 3	Intellectual Property	3,0	90,0		1	202
1.2	Special (professional) training	31,0	930,0			34%
ST 1	Modern Technologies of Defensive Programming	5,0	150,0	1		326
ST 2	Tools and Algorithms for Decision Making	5,0	150,0	1		326
ST 3	Process optimization in multi-service systems and networks	5,0	150,0	1		326
ST 4	Programming for Global Networks	6,0	180,0	1		326
ST 5	Fundamentals of Neurocomputing	5,0	150,0	2		326
ST 6	Fundamentals of Scientific Researches	5,0	150,0	2		326
2	Practical training	11,0	330,0			12%
PT 1	Pre-graduation Practice*	11,0	330,0			326
3	Certification	11,0	330,0			12%
4	Elective educational components	28,0	840,0			31%
4.1	Specialized training	12,0	360,0			13%
4.1.1	Profiled package of educational components 01 "Computer Systems and Networks"	12,0	360,0			
OP1.1	Hardware Facilities of Local and Global Networks	4,0	120,0	2		326
OP1.2	Microcontroller Devices Engineering	4,0	120,0	2		326
OP1.3	Corporate Networks Designing	4,0	120,0	2		326
4.1.2	Profiled package of educational components 02 "System Programming"	12,0	360,0			
OP2.1	Corporate Networking Programming	4,0	120,0	2		326
OP2.2	Compiler Design Theory	4,0	120,0	2		326
OP2.3	Machine Learning	4,0	120,0	2		326
4.1.3	Profiled package of educational components 03 "Specialized Computer Systems"	12,0	360,0			
OP3.1	Corporate Networking Software	4,0	120,0	2		326
OP3.2	Computer Game Content Modeling and Optimization	4,0	120,0	2		326
OP3.3	Methods and Means of Complex Dynamic Objects Modeling	4,0	120,0	2		326
4.2	Educational components of free choice of professional training according to the list (list is attached)	8,0	240,0			9%
OPT 1	OPT 1	4,0	120,0		2	326
OPT 2	OPT 2	4,0	120,0		2	326
4.3	Educational components of free choice of general training according to the list (list is attached)	8,0	240,0			9%
OGT 1	Discipline 1	4,0	120,0		3	
OGT 2	Discipline 2	4,0	120,0		3	
	Total number for the training period	90,0	2700,0			

#### V. EDUCATION PROCESS PLAN

		Seme	ester distri	bution				Number	of hours			Distribu		assroom ho			d ECTS	
								Class	sroom					ourse			urse	i l
					its								Sem	esters		Seme	sters	1
_					Number of ECTS credits				including				1	2	)		3	1
Ne 3n	Name of discipline				ည					õ	ź		Numbe	er of weeks	in the se	emester		1
_				sks		ŧ				ajpr	, K	2	20	20	0	1	6	1
				ta ta	of E	Ioni			2	str	gen							ent
		တ္	_	Individual tasks	Je.	Total amount		Lectures	Laboratory works	Practical studies	Independent work	Classroo m hours	0	Classroo m hours	0	Classroo m hours	σ	Department
		Exams	Tests	di i∑	i i	otal	Total	octr	orks	act	deb	ass	ECTS	ass	ECTS	ass	ECTS credits	eba
4	2	<u>ய</u> ி 3	4	<u>⊆</u> 5	<u> </u>	7	<u>⊢</u> 8	9		11	<u>⊆</u> 12	Ö E 13	<u>ш</u> 5	Ö E 15	<u>Ш</u> 5	Ö E 17	<u>ш</u> 5	29
1 1	Mandatory educational components	3	4	5	40,0	1200,0	480,0	240,0	96,0	144,0	720,0	22,0	30,0	8.0	10,0	17	18	29
1.1	General preparation				9.0	270.0	96,0	48.0	00,0	48.0	174.0	6,0	9,0	0,0	10,0			
GT 1	Foreign Language in Professional Field		1	R	3,0	90.0	32,0	16,0		16,0	58,0	2,0	3,0					275
GT 2	Innovative Entrepreneurship and Startup Project Management		1	R	3,0	90,0	32,0	16,0		16,0	58,0	2,0	3,0					202
GT 3	Intellectual Property		1	R	3,0	90.0	32,0	16,0		16,0	58,0	2,0	3,0					202
1.2	Special (professional) training				31,0	930,0	384,0	192,0	96,0	96,0	546,0	16,0	21,0	8,0	10,0			
ST 1	Modern Technologies of Defensive Programming	1			5,0	150,0	64,0	32,0	16,0	16,0	86,0	4,0	5,0					326
ST 2	Tools and Algorithms for Decision Making	1		С	5,0	150,0	64,0	32,0	16,0	16,0	86,0	4,0	5,0					326
ST 3	Process optimization in multi-service systems and networks	1			5,0	150,0	64,0	32,0	16,0	16,0	86,0	4,0	5,0					326
ST 4	Programming for Global Networks	1		CP	6,0	180,0	64,0	32,0	32,0		116,0	4,0	6,0					326
ST 5	Fundamentals of Neurocomputing	2		CW	5,0	150,0	64,0	32,0	16,0	16,0	86,0			4,0	5,0			326
ST 6	Fundamentals of Scientific Researches	2		R	5,0	150,0	64,0	32,0		32,0	86,0			4,0	5,0		44.0	326
_	Practical training				11,0	330,0					330,0						11,0	
PT 1 3	Pre-graduation Practice*  Certification				11,0 11,0	330,0 330,0					330,0 330,0						11,0 <b>11,0</b>	326
4					28.0	840.0	336.0	224.0	64.0	48.0	504.0			15.0	20,0	24,0	8.0	
4.1	Elective educational components Specialized training				12,0	360,0	144,0	96,0	32,0	16,0	216,0			9.0	12,0	24,0	0,0	
4.1.1	Profiled package of educational components 01 "Computer Systems and Networks"				12,0	360,0	144,0	96,0	32,0	16,0	216,0			9,0	12,0			
OP1.1	Hardware Facilities of Local and Global Networks	2		С	4,0	120,0	48,0	32,0		16,0	72,0			3,0	4,0			326
OP1.2	Microcontroller Devices Engineering	2		С	4,0	120,0	48,0	32,0	16,0	,	72,0			3,0	4,0			326
OP1.3	Corporate Networks Designing	2		С	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			326
4.1.2	Profiled package of educational components 02 "System Programming"				12,0	360,0	144,0	96,0	48,0		216,0			9,0	12,0			
OP2.1	Corporate Networking Programming	2		С	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			326
OP2.2	Compiler Design Theory	2		С	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			326
OP2.3	Machine Learning	2		С	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			326
4.1.3	Profiled package of educational components 03 "Specialized Computer Systems"				12,0	360,0	144,0	96,0	48,0		216,0			9,0	12,0			
OP3.1	Corporate Networking Software	2		С	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			326
OP3.2	Computer Game Content Modeling and Optimization	2		С	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			326
OP3.3	Methods and Means of Complex Dynamic Objects Modeling	2		С	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			326
4.2	Educational components of free choice of professional training according to the list (list is attached)				8,0	240,0	96,0	64,0	32,0		144,0			6,0	8,0			978,0
OPT 1	OPT 1		2		4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			326

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	29
OPT 2	OPT 2		2		4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0			326
4.3	Educational components of free choice of general training according to the list (list is attached)				8,0	240,0	96,0	64,0		32,0	144,0					24,0	8,0	
OGT 1	Discipline 1		3	R	4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0	
OGT 2	Discipline 2		3	R	4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0	
	Total number for the training period				90,0	2700,0	816,0	464,0	160,0	192,0	1884,0	22,0	30,0	23,0	30,0	24,0	30,0	
	Hours per week											22	2,0	23	,0	24	ł,0	
	Number of exams											4	4	5				
	Number of tests											3	3	1		4	1	
	Number of course projects (works)												1					
	Numbers of disciplines per semester											7	,0	7,	0	3	,0	

	Individual tasks
С	Calculated task
CG	Calculated and graphic task
R	Report
CP	Course project
CW	Course work
SRW	Scientific research work

Approved by the Academic Council of NTU "KhPI"

PROTOCOL №5 from 24.05.2024

Vice-rector of Scientific-and-Pedagogical Work

Gennadiy KHRYPUNOV

Head of the educational program "Modern programming, mobile devices and computer game"

Svitlana GAVRYLENKO

**Director of the Educational and Scientific** Institute of Computer Sciences and Information Technologies

name of the institute

Mykhailo GODLEVSKY

**Head of the Department** 

"Computer Engineering and Programming"

Oleksandr ZAKOVOROTNYI

#### KH-M924i.e

# 1 - List of optional student disciplines of the profile training

		Seme	ster distri	bution				Number	of hours			Distributi	on of class	sroom ho	urs per a v	veek and	ECTS cred	dits per a	semester	
								Class	room				1 co	urse			2 cc	urse		
					dits				including				Seme	sters			Seme	sters		1
E					cre				including		J		1		2		3			l
휟	Name of academic discipline			v	TS				rks	es	work			Numbe	er of week	s in the se	emester			i
_				tasks	EC	ţ			0M	studies	ı ,	2	20	2	20	1	16			+=
		Exams	Tests	Individual t	Number of	Total amount	Total	Lectures	Laboratory	Practical st	Independent	Classroo m hours	ECTS credits	Departmer						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	29
4.2	Educational components of free choice of professional training																			
OPT 1	Control and Diagnosis for Computer Systems		2		4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					326
OPT 1	Program Design for Computer Systems and Networks Diagnosis		2		4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					326
OPT 1	Design of Computer Diagnostic Systems		2		4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					326
OPT 2	Application of Multi-valued Logic in Computer Systems		2		4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					326
OPT 2	Software Design of Microcontroller Devices		2		4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					326
OPT 2	Specialized Computer Systems		2		4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					326

# List 2 Educational components of free choice of general training

		Seme	ster distri	bution				Number	of hours			Distributi	on of clas	sroom hou	urs per a v	veek and l	ECTS cre	dits per a s	semester	
								Class	sroom				1 co	urse			2 cc	urse		
					edits						1		Seme	sters			Seme	sters		i l
-					Srec				including				1		2	;	3			i l
티	Name of academic discipline				TS				ks	ý	work			Numbe	er of week	s in the se	mester			i l
Z				sks	ECI	ŧ			works	ıdie	† Ķ	2	:0	2	20	1	6			i
		Exams	Tests	Individual tasks	Number of E	Total amount	Total	Lectures	Laboratory v	Practical studies	Independent	Classroo m hours	ECTS credits	Department						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	29
4.3	Educational components of free choice of general training																			
OGT 1	Ukrainian educational components																			
OGT 1	Ethnolinguistic processes in Ukraine		3		4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0			310
OGT 1	Cultural history of Sloboda Ukraine		3		4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0			310
OGT 1	History of Ukrainian statehood		3		4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0			310
OGT 2	Elective educational component of psychological orientation																			
OGT 2	Psychology of leadership in business		3		4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0			301
OGT 2	Psychology of leadership in education		3		4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0			301
OGT 2	Fundamentals of professional psychology		3		4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0			301
OGT 3	Elective educational component of the legal direction																			
OGT 3	Legal regulation of innovation activities		3		4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0			306
OGT 3	Information law		3		4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0			306
OGT 3	Copyright and related rights		3		4,0	120,0	48,0	32,0		16,0	72,0					12,0	4,0			306