Form Mon1-21_(1,4)



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

CURRICULUM

APPROVED BY

EDUCATIONAL AND SCIENTIFIC PROGRAM

Computer science and information technology

in the field of

Rector of NTU "KhPI"	for the traininç second (master's) level	knowledge	12 Information Technologies		
	(educational level)		(code and name of field of knowledge)		
	Yevgen SOKOL by specialty	- <u>122</u>	Computer science	Qualification 	Master of Science in Computer Science
				Apprenticeship	1 year 4 months

Form of education <u>i.e</u>

I. Schedule of the educational process

									-																		68	
ırsı	September		Octob	er N	lovember	Dece	ember	,	January		February		March	1	April		May		Jur	ne		July		Aug	just		52 16	
Cor	1	2 3 4	5 6 7	8 9 1	0 11 12 13	3 14 15	16 1	17 18 19	20 21	22 2	3 24 25 2	26 27	28 29	30 3 ⁻	1 32 33	34 35 3	36 37 38	39 40	0 41 4	42 43	44 4	5 46 47	48 49	9 50	51 52		9 10 11 1	2 sum ainian le
1								V		V										V	V	/	VV	/ V	V V	T theor. Study	20 20 10	50 T
2					Q Q Q	Q Q D	D																					
																										D diploma project	4	4 Q
																										V Vacation D attestation	2 10	12 V
Marking: Decentralized	applications and blockchain technologies	6	Theore	tical and prac	ctical training					C	Preparation	n of qual	lification	vork	D	Defending	of qualificat	tion work	(K	Vacation	n				D attestation		2 0

II. Consolidated time budgets (in weeks)

Course	Theoretical study	Completion of the thesis	Attestation	Implementation of a diploma project (work)	Vacation	Total
1	40				12	52
2	10		2	4		16
Together	50		2	4	12	68

IV. Attestation

Activities	Number of ECTS credits	Semester
Preparation of qualification work	6.0	11
Defending of qualification work	3.0	11

based on educational degree bachelor's degree

rm Mon1-21_(1,4) V. EDUCATIONAL PROCESS PLAN

ЕРР		Seme	ester distr	ibution				Numl	per of hou	rs		Dis	tribution c	of classroc	m hours	· .	k and EC	CTS credi	its by		
the					1			Clas	sroom				1 co	urse			2 cc	ourse			
ith t					(0								Sem	ester			Sem	ester		_	
					dits				including				 1	2		,	3			_	
anc	Name of academic discipline				Cre						¥			<u>l</u> Number	of week	s in the s	emester	<u> </u>			
ord				ks	TS TS					lies	WOF	2	20	20			0				
acc				task	f E(unt				stud	ent				1					nt -	
. <u>C</u>		(0		lual	er o	amc		es	tory	<u>8</u>	pué	roor		00r		oor		000		tme	
e po		ams	sts	lvid	qu	<u>a</u>	la l	ctur	ora	actic	epe	ISSI JIS	ECTS credits	Classro	ECTS credits	ıssr Jrs	ECTS credits	Classr hours	TS	par	
O		Ж	Te	lnd	Z	Tot	Tot	Ге	lab	Pra	pu	Classi	EC	Cla	EC	Classi hours	EC	Cla	EC	De	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	29	
	Obligatory educational				67.0	2010.0	596.0	230.0	190.0	176.0	1414.0	12.8	20.0	12.0	21.0	10.0	26.0				
	General training				10.00	300.00	112.00			112.00	188.00	2.80	5.00	2.00	2.00	1.60	3.00				KN-M423i
GT1	Foreign language for professional		1-2		4.0	120.0	80.0			80.0	40.0	2.0	2.0	2.0	2.0						KN-M423i
GT2	Intellectual Property		1	R	3.0	90.0	16.0			16.0	74.0	0.8	3.0							202	KN-M423i
GT3	Innovative entrepreneurship and		3	R	3.0	90.0	16.0			16.0	74.0					1.6	3			321	
	startup project management				39.00	1170.00	468.00	230.00	190.00	48.00	702.00	10.00	14.00	10.00	17.00	6.80	8.00				KN-M423i
	Special (professional) training Business analysis methods for				39.00	1170.00	400.00	230.00	190.00	46.00	702.00	10.00	14.00	10.00	17.00	0.00	0.00				KN-M423i
1011	Business analysis methods for managing requirements for intelligent	1		CW	4.0	120.0	60.0	40.0		20.0	60.0	3.0	4.0							321	KN-M423i
PT2	Management of intelligent systems	1			3.0	90.0	40.0	20.0	20.0		50.0	2.0	3.0							321	
DTO	development projects Decise of computational intelligence			-	0.0	00.0	40.0	00.0	00.0		50.0	0.0	0.0								KN-M423i
	Basics of computational intelligence	1			3.0	90.0	40.0	20.0	20.0		50.0	2.0	3.0								KN-M423i
PT4 PT5	Methods of intelligent data analysis Workshop "Intelligent Systems"	ı	2		4.0	120.0 120.0	60.0	20.0	40.0	28.0	60.0 92.0	3.0	4.0			2.8	4.0				KN-M423i
F13	Workshop "Intelligent Systems" Mathematical models of complex		3		4.0	120.0	20.0			20.0	92.0					2.0	4.0			321	KN-M423i
PT6	systems and decision support	2			4.0	120.0	60.0	40.0	20.0		60.0			3.0	4.0					321	 KN-M423i
	Models of artificial intelligence	3			4.0	120.0	40.0	20.0	20.0		80.0					4.0	4.0				KN-M423i
	Decentralized applications and							20.0								1.0	1.0				
11310	blockchain technologies	2			3.0	90.0	40.0	20.0	20.0		50.0			2.0	3.0					321	KN-M423i
PT9	Life cycle management of intelligent		2	1	3.0	90.0	20.0	10.0	10.0		70.0			1.0	3.0						KN-M423i
	Databases and knowledge	2			4.0	120.0	40.0	20.0	20.0		80.0			2.0	4.0						KN-M423i
DT44	Architecture and software design of	0			0.0	00.0	40.0	00.0	00.0		50.0			0.0	0.0					004	
PT11	intelligent systems	2			3.0	90.0	40.0	20.0	20.0		50.0			2.0	3.0					321	KN-M423i
1.3	Scientific training				18.00	540.00	16.00			16.00	524.00		1.00		2.00	1.60	15.00				KN-M423i
ST1	Basics of the scientific research		3	R	3.0	90.0	16.0			16.0	74.0					1.6	3.0			321	KN-M423i
ST2	R&D		2		1.0	30.0					30.0				1.0					321	KN-M423i
ST3	Pre-diploma practice		3		5.0	150.0					150.0		1.0		1.0		3.0			321	∐KN-M423i
	Attestation				9.0	270.0					270.0						9.0			321	KN-M423i
2	Optional educational components				23.0	690.0	250.0	110.0		140.0	440.0	4.5	10.0	6.0	9.0	4.0	4.0				KN-M423i
	Profile training				15.00	450.00	130.00	50.00		80.00	320.00	4.50	10.00	2.00	5.00						KN-M423i
2.1.1	Profiled discipline package 01				15.00	450.00	130.00	50.00		80.00	320.00	4.50	10.00	2.00	5.00						
	«Business Intelligence»											_	_								
	BI technologies		1 1		5.0	150.0	40.0	20.0		20.0	110.0	2.0	5.0							321	
OP 1.2	Data Mining Tools		1		5.0	150.0	50.0	20.0		30.0	100.0	2.5	5.0	2.2	F ^		<u> </u>				KN-M423i
	Data visualization tools Profiled discipling package 02		2		5.0 15.00	150.0 450.00	40.0 130.00	10.0 50.00		30.0 80.00	110.0 320.00	4.50	10.00	2.0 2.00	5.0 5.00					321	KN-M423i
2.1.2	Profiled discipline package 02 «Computational intelligence»				13.00	430.00	130.00	30.00		00.00	320.00	4.30	10.00	2.00	3.00						KN-M423i
	Evolutionary technologies in artificial																				1\ \n= \ 4\ 2\ 3
1(1)ロン1	intelligence systems		1		5.0	150.0	40.0	20.0		20.0	110.0	2.0	5.0							321	 KN-M423i
	Development of neural network		 																		_ `*-\\\ \\
171077	models for artificial intelligence tasks		1		5.0	150.0	50.0	20.0		30.0	100.0	2.5	5.0							321	 KN-M423i
	Models and methods of soft		2		5.0	150.0	40.0	10.0		30.0	110.0			2.0	5.0						KN-M423 KN-M423
2.1.3	Profiled discipline package 03				15.00	450.00	130.00	50.00		80.00	320.00	4.50	10.00	2.00	5.00						I VI A IVITZO
	«Machine Learning»																				KN-M423i
	Machine Learning methods		1		5.0	150.0	40.0	20.0		20.0	110.0	2.0	5.0							321	KN-M423i
OP 3.1	Imacinic Ecailing inclines		•	_				—	-	_			_	-	•	i	-				
	Reinforcement learning		1		5.0	150.0	50.0	20.0		30.0	100.0	2.5	5.0							321	KN-M423i

Optional disciplines of profile training (the list is attached)	2-3	8.00	240.00	120.00	60.00		60.00	120.00			4.00	4.00	4.00	4.00		K	(N-M423i.e
Total for education period		90.0	2700.0	846.0	340.0	190.0	316.0	1854.0	17.3	30.0	18.0	30.0	14.0	30.0		P	(N-M423i.e
Hours per week									17	.3	18.	.0	14	1.0		<u> </u>	KN-M423i.e
Number of exams																ŀ	KN-M423i.e
Number of credits																ŀ	(N-M423i.e
Number of course projects (papers)																ŀ	KN-M423i.e
Number of disciplines in the semester									8.	0	5.0	0	5	.0		ŀ	KN-M423i.e

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

Approved by the Academic Council of NTU "KhPI"

protocol No. 5 from 02.06.2023

Head of the educational program Computer

Science and Intelligent Systems

Vice-rector of Scientific-and-
Pedagogical Work

Ruslan MYGUSHCHENKO

signature

signature

Oleksandr SHMATKO

Director of Educational and Scientific Institute of Computer Science and Information Technology

____Mykhailo GODLEVSKYI

Head of the Department of Software Engineering and Management Intelligent Technologies

____Igor HAMAYUN

signature

signature

VI ELECTIVE DISCIPLINES

		Distribu	tion by se	mesters				Number	of hours			Distribu	tion of cla	ssroom ho	ours per	week and	d ECTS c	redits by	semester		
								Aud	itory				1 co	urse			2 cc	ourse			
					lits				1				Seme	ester			Sem	ester			
					cred				including			,	1	2		,	3		4		
S S	The name of the academic discipline			(0	 	l t					or X			Number	of week	s in the s	emester				
				asks		nou					t w	2	0	20)	1	0			1	
		Exams	Credits	Individual ta	Number of I	The total ar	In total	ectures	aboratory	oractical	Independer	Auditory hours	ECTS credits	Auditory hours	ECTS credits	Auditory hours	ECTS credits	Auditory 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	
2.2	Optional disciplines of profile training																				KN-M423i.e
OPT1	Data Integration and Cleaning (ETL)		2		4.0	120.0	80.0	40.0		40.0	40.0			4.0	4.0					321	KN-M423i.e
OPT2	Analytical data warehouses		2		4.0	120.0	80.0	40.0		40.0	40.0			4.0	4.0					321	KN-M423i.e
OPT3	Cloud Computing: cloud technologies and applications		2		4.0	120.0	80.0	40.0		40.0	40.0			4.0	4.0					321	KN-M423i.e
OPT4	Group dynamics and communications		2		4.0	120.0	80.0	40.0		40.0	40.0			4.0	4.0					321	KN-M423i.e
OPT5	Distributed and parallel computing		3		4.0	120.0	40.0	20.0		20.0	80.0					4	4			321	KN-M423i.e
OPT6	Modern programming technologies		3		4.0	120.0	40.0	20.0		20.0	80.0					4	4			321	KN-M423i.e
OPT7	Decentralized applications and blockchain technologies		3		4.0	120.0	40.0	20.0		20.0	80.0					4	4			321	KN-M423i.e
OPT8	Introduction to DevOps		3		4.0	120.0	40.0	20.0		20.0	80.0					4	4				KN-M423i.e

CONTENTS OF THE CURRICULUM

master's training:

specialty 121 Software engineering

			Total amo	unt			1
Number in order	Discipline title	ECTS credits	Hours	Sem	esters	Department code	:
		LOTO Credits	riours	Exam	Test		_
1	2	3	4	5	6	7	
	Obligatory educational components	67.0	2010.0			55.8%	
.1	General training	10.0	300.0			11.1%	KN-M
T1	Foreign language for professional purposes	4.0	120.0		1-2	275	KN-N
T2	Intellectual Property	3.0	90.0		1	202	KN-N
T3	Innovative entrepreneurship and startup project management	3.0	90.0		3	321	KN-M
.2	Special (professional) training	39.0	1170.0			43.3%	KN-M
T1	Dusiness analysis metrious for managing requirements for intempent	4.0	120.0	1		321	KN-M
T2	Management of intelligent systems development projects	3.0	90.0	1		321	KN-N
T3	Basics of computational intelligence	3.0	90.0	1		321	KN-N
T4	Methods of intelligent data analysis	3.0	90.0	1		321	KN-N
T5	Workshop "Intelligent Systems"	4.0	120.0			321	KN-M
T6	Mathematical models of complex systems and decision support	4.0	120.0	2		321	KN-M
T7	Decentralized applications and blockchain technologies	3.0	90.0	3	3	321	KN-M
T8	Decentralized applications and blockchain technologies	3.0	90.0	2		321	KN-M
T9	Life cycle management of intelligent systems	3.0	90.0			321	KN-M
T10	Databases and knowledge	4.0	120.0	2		321	KN-M
T11	Architecture and software design of intelligent systems				2	321	KN-M
.3	Scientific training	18.0	540.0			15%	KN-N
Т1	Basics of the scientific research	3.0	90.0		3	321	KN-N
T2	R&D	2.0	60.0			275	KN-N
T3	Pre-diploma practice	3.0	90.0		2	321	KN-M
		13.0	390.0		1-3	321	KN-M
		10.0	000.0		10	021	-
	Attestation	9.0	270.0			321	KN-N
	Optional educational components	23.0	690.0			25.6%	KN-M
.1	Professional training	12.0	360.0			10%	KN-M
.1.1	Profiled discipline package 01 «Business Intelligence»	15.0	450.0				KN-M
)P 1.1	BI technologies	5.0	150.0		1	321	KN-M
P 1.2	Data Mining Tools	5.0	150.0		1	321	KN-M
P 1.3	Data visualization tools	5.0	150.0		2	321	KN-M
.1.2	Profiled package of disciplines 02 "Cloud Computing"	15.0	450.0				KN-M
P 2.1	Evolutionary technologies in artificial intelligence systems	5.0	150.0		1	321	KN-M
P 2.2	Development of neural network models for artificial intelligence tasks	5.0	150.0		1	321	KN-M
P 2.3	Models and methods of soft computing	5.0	150.0		2	321	KN-M
1.3	Promed package of disciplines of Artificial intelligence and machine	15.0	450.0				KN-M
P 3.1	Machine Learning methods	5.0	150.0		1	321	KN-M
P 3.2	Reinforcement learning	5.0	150.0		1	321	KN-N
P 3.3	Machine Learning models and frameworks	5.0	150.0		2	321	KN-N
<u> </u>	Disciplines of free choice of specialized training according to the	8.0	240.0				
2.2	list (the list is attached)	8.0	240.0				KN-N