Форма Мон1-21_(1,4)

IKM-M123i.e

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

CURRICULUM

educational and professional program
Computer and Mathematical Modeling

APPROVED BY Yevgen SOKOL "02" 06 2023 p.

for the training second (master`s) level (освітній рівень)

in the field of knov 11 Mathematics and Statistics (шифр і назва галузі знань)

by specialty - 113 Applied Mathematics

Qualification Master on Applied Mathematics

Period of study 1 рік 4 місяці

on the basi bachelor's degree

Form of study full-time

I. Schedule of education process

Курс	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	T	V	E	E	E	V	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
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		

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CONTENT of CURRICULUM

for the master`s training:

by specialty **113** **Applied Mathematics**

№ з/п	Discipline title	Total amount				Department code
		ECTS creits	Hours	Semester		
				Exam	Test	
1	2	3	4	5	6	7
1	**Obligatory educational components**	**37,0**	**1110,0**			**31%**
1.1	**General training**	**6,0**	**180,0**			**5%**
GT 1	Innovative entrepreneurship and startup project management	3,0	90,0		1	202
GT 2	Intellectual Property	3,0	90,0		2	202
1.2	**Professional training**	**31,0**	**930,0**			**26%**
PP 1	Methods of mathematical modeling and data analysis	5,0	150,0	1		161
PP 2	Nonlinear processes and models	4,0	120,0	1		161
PP 3	Modeling in CAE systems	4,0	120,0	1		161
PP 4	Mathematical methods of data visualization	3,0	90,0	2		161
PP 5	Computational intelligence	3,0	90,0	2		161
PP 6	Modeling in CAE systems	3,0	90,0	2		161
PP 7	Nonlinear mechanics of solid deformable body	3,0	90,0	2		161
PP 8	Basics of the scientific research	3,0	90,0		1	161
PP 9	Project work	3,0	90,0		2	161
2	**Practical training**	**15,0**	**450,0**			**13%**
PT 1	Prediploma practice*	15,0	450,0		3	161
3	**Attestation**	**15,0**	**450,0**			**13%**
4	**Optional educational component**	**23,0**	**690,0**			**19%**
4.1	**Optional student disciplines of the profile preparation according to the list (the list is attached)**	23,0	690,0		1,2	19%
	Total for education period	**90,0**	**2700,0**			

List 1 Optional student disciplines of the profile training

Number in order	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
							Classroom					1 course				2 course				
								including				Semesters				Semesters				
												1		2		3		4		
												Number of weeks in the semester								
												20		20		20		16		
		Exams	Tests	Individual tasks		Total amount	Total	Lectures	Laboratory works	Practical studies	Independent work	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	29
4.1	**Optional student disciplines of the profile training**																			
4.1.1	**Discipline in "Mechanics of a solid deformed**																			
4.1.1.1	Contact mechanics and numerical modeling of		1	C	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0							**161**
4.1.1.2	Mixed problems for thin-walled structures		1	C	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0							**161**
4.1.1.3	Elastic-plastic deformation of plates and shells		1	C	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0							**161**
4.1.2	**Discipline in "Modeling of dynamic**																			
4.1.2.1	Mathematical methods of analysis of machine		1	C	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0							**161**
4.1.2.2	Computer modeling of dynamics and vibration		1	C	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0							**161**
4.1.2.3	Dynamics of rotors in magnetic bearings		1	C	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0							**161**
4.1.3	**Discipline in "Special numerical methods"**																			
4.1.3.1	FEM algorithms		1	C	3,0	90,0	32,0	16,0	16,0		58,0	2,0	3,0							**161**
4.1.3.2	Programming of modern numerical methods		1	C	3,0	90,0	32,0	16,0	16,0		58,0	2,0	3,0							**161**
4.1.3.3	Parallel computing on CPU/GPU/CUDA		1	C	3,0	90,0	32,0	16,0	16,0		58,0	2,0	3,0							**161**
4.1.4	**Discipline in "Information Technologies"**																			
4.1.4.1	Application development using the component		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					**161**
4.1.4.2	Integrated computer systems for design and		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					**161**
4.1.4.3	Data-driven approaches in modeling		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					**161**
4.1.5	**Discipline in "Mechanics of a solid deformed**																			
4.1.5.1	Mathematical models of composite materials		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					**161**
4.1.5.2	Rheology of modern materials		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					**161**
4.1.5.3	Modern methods of modeling the mechanics of		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					**161**
4.1.6	**Discipline in "Modeling of multiphysical**																			
4.1.6.1	Modeling of liquid and gas flow		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					**161**
4.1.6.2	Computer solution of coupled problems		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					**161**
4.1.6.3	Numerical modeling of aeroelasticity problems		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0					**161**

V. EDUCATION PROCESS PLAN

Number in order	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
							Classroom					1 course				2 course				
								including				Semesters				Semesters				
												1		2		3		4		
												Number of weeks in the semester								
												20		20		20		16		
		Exams	Tests	Individual tasks		Total amount	Total	Lectures	Laboratory works	Practical studies	Independent work	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	29
1	**Obligatory educational components**				**37,0**	**1110,0**	**400,0**	**224,0**	**128,0**	**48,0**	**710,0**	**14,0**	**19,0**	**11,0**	**18,0**					
1.1	**General training**				**6,0**	**180,0**	**64,0**	**48,0**		**16,0**	**116,0**	**2,0**	**3,0**	**2,0**	**3,0**					
GT 1	**Innovative entrepreneurship and startup**		1	R	3,0	90,0	32,0	16,0		16,0	58,0	2,0	3,0							**202**
GT 2	**Intellectual Property**		2	R	3,0	90,0	32,0	32,0			58,0			2,0	3,0					**202**
1.2	**Professional training**				**31,0**	**930,0**	**336,0**	**176,0**	**128,0**	**32,0**	**594,0**	**12,0**	**16,0**	**9,0**	**15,0**					
PP 1	**Methods of mathematical modeling and data analysis**	1		C	5,0	150,0	64,0	32,0	32,0		86,0	4,0	5,0							**161**
PP 2	**Nonlinear processes and models**	1		C	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0							**161**
PP 3	**Modeling in CAE systems**	1		C	4,0	120,0	48,0	32,0	16,0		72,0	3,0	4,0							**161**
PP 4	**Mathematical methods of data visualization**	2		C	3,0	90,0	32,0	16,0	16,0		58,0			2,0	3,0					**161**
PP 5	**Computational intelligence**	2		C	3,0	90,0	32,0	16,0	16,0		58,0			2,0	3,0					**161**
PP 6	**Modeling in CAE systems**	2		C	3,0	90,0	48,0	32,0	16,0		42,0			3,0	3,0					**161**
PP 7	**Nonlinear mechanics of solid deformable body**	2		C	3,0	90,0	32,0	16,0	16,0		58,0			2,0	3,0					**161**
PP 8	**Basics of the scientific research**		1	CW	3,0	90,0	32,0			32,0	58,0	2,0	3,0							**161**
PP 9	**Project work**		2		3,0	90,0					90,0				3,0					**161**
2	**Practical training**				**15,0**	**450,0**					**450,0**								**15,0**	
PT 1	**Prediploma practice***		3		15,0	450,0					450,0								15,0	**161**
3	**Attestation**				**15,0**	**450,0**					**450,0**								**15,0**	**161,0**
4	**Optional educational component**				**23,0**	**690,0**	**272,0**					**8,0**	**11,0**	**9,0**	**12,0**					
4.1	**Optional student disciplines of the profile preparation according to the list (the list is attached)**		1,2		23,0	690,0	272,0					**8,0**	**11,0**	**9,0**	**12,0**					**161**
	Total for education period				**90,0**	**2700,0**	**672,0**	**224,0**	**128,0**	**48,0**	**1610,0**	**22,0**	**30,0**	**20,0**	**30,0**				**30,0**	
	Hours per week											22,0		20,0						
	Number of exams											3		4						
	Number of tests											5		4		7				
	Number of course projects (works)											1		1		1				
	Numbers of disciplines per semester											8,0		7,0						

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	29

Individual tasks	
C	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 _02.06.2023__

Vice-rector of Scientific-and-Pedagogical Work

_____ **Genadii KHRIPUNOV**

Signature Full name

Director of the Institute

назва інституту/факультету

_____ **Oleksiy LARIN**

Signature Full name

назва кафедри підпис ІП

Chairman of the support group for the specialty Applied Mathematics

_____ **Oleksiy LARIN**

Signature Full name

Head of the Department Mathmatical modelling and computation inteligence in engineering

_____ **Oleksii VODKA**

Signature Full name

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