



## V. EDUCATION PROCESS PLAN

Code in accordance with the EPP	Name of academic discipline	Semester distribution				Number of hours							Distribution of classroom hours per a week and ECTS credits per a semester																Department
		Exams	Tests	Individual tasks	Number of ECTS credits	Total amount	Classroom			Independent work	I course				II course				III course				IV course						
							Total	including			S e m e s t e r s																		
		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									
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	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	
<b>1</b>	<b>Obligatory educational components</b>				<b>152,0</b>	<b>4560,0</b>	<b>2024,0</b>	<b>720,0</b>	<b>440,0</b>	<b>864,0</b>	<b>2536,0</b>	<b>25,0</b>	<b>30,0</b>	<b>25,0</b>	<b>30,0</b>	<b>22,0</b>	<b>25,0</b>	<b>18,0</b>	<b>21,0</b>	<b>14,0</b>	<b>17,0</b>	<b>11,0</b>	<b>11,0</b>	<b>13,0</b>	<b>16,0</b>	<b>2,0</b>	<b>2,0</b>		
<b>1.1</b>	<b>General training</b>				79,0	2370,0	1084,0	320,0	80,0	684,0	1286,0	16,0	19,0	20,0	24,0	14,0	15,0	9,0	10,0	4,0	5,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	
GT 1	History and Culture of Ukraine	1		R	4,0	120,0	48,0	16,0		32,0	72,0	3,0	4,0																310
GT 2	Ukrainian as a Foreign Language		1,2,3,4	R	8,0	240,0	128,0			128,0	112,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0											273
GT 3	English Language for professional purposes		3,4,5,6,7,8	R	12,0	360,0	172,0			172,0	188,0					2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	275
GT 4	Philosophy	4		R	3,0	90,0	32,0	16,0		16,0	58,0						2,0	3,0											307
GT 5	Jurisprudence		3	R	3,0	90,0	32,0	16,0		16,0	58,0					2,0	3,0												306
GT 6	History of Science and Technology		5	R	3,0	90,0	32,0	16,0		16,0	58,0									2,0	3,0								310
GT 7	Ecology		2	R	3,0	90,0	32,0	16,0	16,0		58,0			2,0	3,0														144
GT 8	Electrotechnical Materials		2	C	4,0	120,0	48,0	32,0	16,0		72,0			3,0	4,0														133
GT 9	Higher Mathematics p.1	1		C	6,0	180,0	80,0	32,0		48,0	100,0	5,0	6,0																170
GT 9	Higher Mathematics p.2	2		C	6,0	180,0	80,0	32,0		48,0	100,0			5,0	6,0														170
GT 9	Higher Mathematics p.3	3		C	4,0	120,0	64,0	32,0		32,0	56,0					4,0	4,0												170
GT 9	Higher Mathematics p.4		4	C	3,0	90,0	48,0	16,0		32,0	42,0							3,0	3,0										170
GT 10	Physics p.1	1		C	5,0	150,0	64,0	32,0	16,0	16,0	86,0	4,0	5,0																168
GT 10	Physics p.2	2		C	4,0	120,0	64,0	32,0	16,0	16,0	56,0			4,0	4,0														168
GT 10	Physics p.3	3		C	4,0	120,0	64,0	32,0	16,0	16,0	56,0					4,0	4,0												168
GT 11	Language of Professional Training	2	1	R	7,0	210,0	96,0			96,0	114,0	2,0	2,0	4,0	5,0														275
<b>1.2</b>	<b>Professional training</b>				<b>73,0</b>	<b>2190,0</b>	<b>940,0</b>	<b>400,0</b>	<b>360,0</b>	<b>180,0</b>	<b>1250,0</b>	<b>9,0</b>	<b>11,0</b>	<b>5,0</b>	<b>6,0</b>	<b>8,0</b>	<b>10,0</b>	<b>9,0</b>	<b>11,0</b>	<b>10,0</b>	<b>12,0</b>	<b>9,0</b>	<b>9,0</b>	<b>11,0</b>	<b>14,0</b>				
PT 1	Descriptive Geometry, Engineering and Computer Graphics	1		CG	4,0	120,0	48,0	16,0		32,0	72,0	3,0	4,0																163
PT 2	Introduction to Speciality. Introductory Practice		1	R	3,0	90,0	48,0	16,0	32,0		42,0	3,0	3,0																128
PT 3	Informatics	1		C	4,0	120,0	48,0	16,0	32,0		72,0	3,0	4,0																128
PT 4	Fundamentals of Programming and Information Technology	2		C	6,0	180,0	80,0	32,0	48,0		100,0			5,0	6,0														128
PT 5	Theory of Electric Circuits	3		C	5,0	150,0	64,0	32,0	16,0	16,0	86,0					4,0	5,0												137
PT 6	Fundamentals of Electronic Device Design	3		C	5,0	150,0	64,0	32,0	32,0		86,0					4,0	5,0												128
PT 7	Analog Electronics	4		CG	6,0	180,0	80,0	32,0	32,0	16,0	100,0							5,0	6,0										128
PT 8	Computational Mathematics	4		C	5,0	150,0	64,0	32,0	32,0		86,0							4,0	5,0										128
PT 9	Digital Electronics	5		CP	6,0	180,0	80,0	32,0	32,0	16,0	100,0									5,0	6,0								128
PT 10	Sensors of Electric Quantities and Non-electrical Quantities	5		C	6,0	180,0	80,0	32,0	32,0	16,0	100,0									5,0	6,0								128
PT 11	Fundamentals of Occupational Safety and Health		6	C	3,0	90,0	36,0	24,0		12,0	54,0											3,0	3,0						144
PT 12	Microprocessor Engineering	6		CP	6,0	180,0	72,0	24,0	24,0	24,0	108,0											6,0	6,0						128
PT 13	Microcontrollers	7		C	6,0	180,0	80,0	32,0	32,0	16,0	100,0														5,0	6,0			128
PT 14	Enterprise Economics		7	C	3,0	90,0	32,0	16,0		16,0	58,0														2,0	3,0			202
PT 15	Electromagnetic Technique	7		C	5,0	150,0	64,0	32,0	16,0	16,0	86,0														4,0	5,0			128

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		
<b>2</b>	<b>Practical Preparation</b>				12,0	360,0					360,0												6,0				6,0			
PP 1	Practical Training*				6,0	180,0					180,0												6,0							
PP 2	Pre-graduation Practice*				6,0	180,0					180,0																6,0			
<b>3</b>	<b>Attestation*</b>				6,0	180,0					180,0																6,0			
<b>4</b>	<b>Optional educational components</b>				70,0	2100,0	856,0	472,0	324,0	72,0	1244,0					4,0	5,0	7,0	9,0	10,0	13,0	12,0	13,0	11,0	14,0	20,0	16,0			
4.1	Profile training				26,0	780,0	332,0	164,0	140,0	28,0	448,0					4,0	5,0	4,0	5,0	4,0	5,0	5,0	5,0	5,0	6,0					
4.1.1	Profiled discipline package 01 "Industrial electronics"				26,0	780,0	332,0	164,0	140,0	28,0	448,0					4,0	5,0	4,0	5,0	4,0	5,0	5,0	5,0	5,0	6,0					
OP 1.1	Solid-State Electronics	3		C	5,0	150,0	64,0	32,0	32,0		86,0					4,0	5,0												128	
OP 1.2	Fundamentals of Electronic Equipment	4		C	5,0	150,0	64,0	32,0	32,0		86,0							4,0	5,0										128	
OP 1.3	Computer Design of Electronic Devices	5		CG	5,0	150,0	64,0	32,0	32,0		86,0									4,0	5,0								128	
OP 1.4	Power Electronics	6		CG	5,0	150,0	60,0	36,0	12,0	12,0	90,0											5,0	5,0						128	
OP 1.5	Theory of Automatic Regulation	7		CP	6,0	180,0	80,0	32,0	32,0	16,0	100,0													5,0	6,0				128	
4.1.2	Profiled discipline package 02 "Biomedical electronics"				26,0	780,0	332,0	164,0	140,0	28,0	448,0					4,0	5,0	4,0	5,0	4,0	5,0	5,0	5,0	5,0	6,0					
OP 2.1	Physical Basis of Electronic Equipment	3		C	5,0	150,0	64,0	32,0	32,0		86,0					4,0	5,0													128
OP 2.2	Anatomy and Biophysical Processes	4		R	5,0	150,0	64,0	32,0	32,0		86,0							4,0	5,0											128
OP 2.3	Electrotechnical Materials and Electronic Components in Medicine	5		C	5,0	150,0	64,0	32,0	32,0		86,0										4,0	5,0								128
OP 2.4	Functional Diagnostics	6		CG	5,0	150,0	60,0	36,0	12,0	12,0	90,0											5,0	5,0							128
OP 2.5	Diagnostic Devices and Systems	7		CW	6,0	180,0	80,0	32,0	32,0	16,0	100,0														5,0	6,0				128
4.2	Optional student disciplines of the profile preparation according to the list				32,0	960,0	392,0	220,0	184,0		568,0								3,0	4,0	3,0	4,0	4,0	4,0	3,0	4,0	20,0	16,0		128
4.3	Optional student disciplines from the general university catalog of disciplines				12,0	360,0	132,0	88,0		44,0	228,0										3,0	4,0	3,0	4,0	3,0	4,0				
OD 1	Discipline 1		5		4,0	120,0	48,0	32,0		16,0	72,0										3,0	4,0								
OD 2	Discipline 2		6		4,0	120,0	36,0	24,0		12,0	84,0											3,0	4,0							
OD 3	Discipline 3		7		4,0	120,0	48,0	32,0		16,0	72,0													3,0	4,0					
<b>Total for education period</b>					<b>240,0</b>	<b>7200,0</b>	<b>2880,0</b>				<b>4320,0</b>	<b>25,0</b>	<b>30,0</b>	<b>25,0</b>	<b>30,0</b>	<b>26,0</b>	<b>30,0</b>	<b>25,0</b>	<b>30,0</b>	<b>24,0</b>	<b>30,0</b>	<b>23,0</b>	<b>30,0</b>	<b>24,0</b>	<b>30,0</b>	<b>22,0</b>	<b>30,0</b>			
Hours per week												25,0	30,0	25,0	30,0	26,0	30,0	25,0	30,0	24,0	30,0	23,0	30,0	24,0	30,0	22,0				
Number of exams												5	5	5	5	4	3	4	4											
Number of tests												3	2	3	3	3	3	3	1											
Number of course projects (works)																1	1	1												
Numbers of disciplines per semester												8	7	8	8	7	6	7	5											

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 № \_\_\_\_\_ from \_\_\_\_\_ 202\_\_

Vice-rector of Scientific-and-Pedagogical Work \_\_\_\_\_ Gennadiy KHRYPUNOV  
signature full name

Head of the Educational Program  
"Electronics"

\_\_\_\_\_ OIha BUTOVA  
signature full name

Director of the Educational and Scientific  
Institute of Energy, Electronics and  
Electromechanics

name of the Institute

\_\_\_\_\_ Roman TOMASHEVSKYI  
signature full name

Head of the Department of Industrial  
and Biomedical Electronics

name of department

\_\_\_\_\_ Serhii KRYVOSHEIEV  
signature full name

## 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	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		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
4.2	Optional student disciplines of the profile training																											
OPT 1	Transient Processes in Electrical Circuits		4	C	4,0	120,0	48,0	16,0	16,0	16,0	72,0							3,0	4,0									137
OPT 2	Semiconductor Devices		4	C	4,0	120,0	48,0	32,0	16,0		72,0							3,0	4,0									128
OPT 3	Biomedical Sensors		4	C	4,0	120,0	48,0	32,0	16,0		72,0							3,0	4,0									128
OPT 4	Metrology and Data Processing	5		C	4,0	120,0	48,0	32,0	16,0		72,0									3,0	4,0							128
OPT 5	Electrical Machines and Apparatus	5		C	4,0	120,0	48,0	32,0	16,0		72,0									3,0	4,0							126
OPT 6	Basis of Software Development	5		C	4,0	120,0	48,0	16,0	32,0		72,0									3,0	4,0							128
OPT 7	Computer Modeling of Electronic Devices	6		CG	4,0	120,0	48,0	24,0	24,0		72,0											4,0	4,0					128
OPT 8	Automatization Design of Electronic Devices and Systems	6		CG	4,0	120,0	48,0	24,0	24,0		72,0											4,0	4,0					128
OPT 9	Signal Converters and Interfaces	6		C	4,0	120,0	48,0	24,0	24,0		72,0											4,0	4,0					128
OPT 10	Power Electronics. Inverters	7		CG	4,0	120,0	48,0	32,0	16,0		72,0													3,0	4,0			128
OPT 11	Sources of Power Supplies of Medical Equipment	7		CG	4,0	120,0	48,0	32,0	16,0		72,0													3,0	4,0			128
OPT 12	Data Acquisition and Signal Processing	7		CG	4,0	120,0	48,0	32,0	16,0		72,0													3,0	4,0			128
OPT 13	Power Semiconductor Devices	8		C	4,0	120,0	50,0	30,0	20,0		70,0															5,0	4,0	128
OPT 14	Power Electronics. Power Supplies	8		C	4,0	120,0	50,0	30,0	20,0		70,0															5,0	4,0	128
OPT 15	Fundamentals of Digital Signal Processing	8		C	4,0	120,0	50,0	20,0	30,0		70,0															5,0	4,0	128
OPT 16	Physiotherapeutic Equipment	8		C	4,0	120,0	50,0	30,0	20,0		70,0															5,0	4,0	128
OPT 17	Microcontroller Devices for Processing Medical Information	8		C	4,0	120,0	50,0	30,0	20,0		70,0															5,0	4,0	128
OPT 18	Programming of Microcontroller Systems	8		C	4,0	120,0	50,0	30,0	20,0		70,0															5,0	4,0	128
OPT 19	Control and Visualization Electronics	8		C	4,0	120,0	50,0	20,0	30,0		70,0															5,0	4,0	128
OPT 20	Microcontroller Systems	8		C	4,0	120,0	50,0	20,0	30,0		70,0															5,0	4,0	128
OPT 21	Telemedicine	8		R	4,0	120,0	50,0	20,0	30,0		70,0															5,0	4,0	128
OPT 22	Smart Grid Technology in Electronics	8		R	4,0	120,0	50,0	20,0	30,0		70,0															5,0	4,0	128
OPT 23	Fundamentals of Electronic Devices and Systems Design	8		C	4,0	120,0	50,0	20,0	30,0		70,0															5,0	4,0	128
OPT 24	Grid-Connected Converters	8		C	4,0	120,0	50,0	30,0	20,0		70,0															5,0	4,0	128

## CONTENT of CURRICULUM

for the training of the first (bachelor) level:  
by specialty

171

Electronics

Number in order	Discipline title	Total amount				Department code
		ECTS credits	Hours	Semesters		
				Exam	Test	
1	2	3	4	5	6	7
<b>1</b>	<b>Obligatory educational components</b>	<b>152,0</b>	<b>4560,0</b>			<b>63,33%</b>
<b>1.1</b>	<b>General training</b>	79,0	2370,0			<b>52%</b>
GT 1	History and Culture of Ukraine	4,0	120,0	1		<b>310</b>
GT 2	Ukrainian as a Foreign Language	8,0	240,0		1,2,3,4	<b>273</b>
GT 3	English Language for professional purposes	12,0	360,0		3,4,5,6,7,8	<b>275</b>
GT 4	Philosophy	3,0	90,0	4		<b>307</b>
GT 5	Jurisprudence	3,0	90,0		3	<b>306</b>
GT 6	History of Science and Technology	3,0	90,0		5	<b>310</b>
GT 7	Ecology	3,0	90,0		2	<b>144</b>
GT 8	Electrotechnical Materials	4,0	120,0		2	<b>133</b>
GT 9	Higher Mathematics p.1	6,0	180,0	1		<b>170</b>
GT 9	Higher Mathematics p.2	6,0	180,0	2		<b>170</b>
GT 9	Higher Mathematics p.3	4,0	120,0	3		<b>170</b>
GT 9	Higher Mathematics p.4	3,0	90,0		4	<b>170</b>
GT 10	Physics p.1	5,0	150,0	1		<b>168</b>
GT 10	Physics p.2	4,0	120,0	2		<b>168</b>
GT 10	Physics p.3	4,0	120,0	3		<b>168</b>
GT 11	Language of Professional Training	7,0	210,0	2	1	<b>275</b>
<b>1.2</b>	<b>Professional training</b>	73,0	2190,0			<b>48%</b>
PT 1	Descriptive Geometry, Engineering and Computer Graphics	4,0	120,0	1		<b>163</b>
PT 2	Introduction to Speciality. Introductory Practice	3,0	90,0		1	<b>128</b>
PT 3	Informatics	4,0	120,0	1		<b>128</b>
PT 4	Fundamentals of Programming and Information Technology	6,0	180,0	2		<b>128</b>
PT 5	Theory of Electric Circuits	5,0	150,0	3		<b>137</b>
PT 6	Fundamentals of Electronic Device Design	5,0	150,0	3		<b>128</b>
PT 7	Analog Electronics	6,0	180,0	4		<b>128</b>
PT 8	Computational Mathematics	5,0	150,0	4		<b>128</b>
PT 9	Digital Electronics	6,0	180,0	5		<b>128</b>
PT 10	Sensors of Electric Quantities and Non-electrical Quantities	6,0	180,0	5		<b>128</b>
PT 11	Fundamentals of Occupational Safety and Health	3,0	90,0		6	<b>144</b>
PT 12	Microprocessor Engineering	6,0	180,0	6		<b>128</b>
PT 13	Microcontrollers	6,0	180,0	7		<b>128</b>
PT 14	Enterprise Economics	3,0	90,0		7	<b>202</b>
PT 15	Electromagnetic Technique	5,0	150,0	7		<b>128</b>
<b>2</b>	<b>Practical Preparation</b>	<b>12,0</b>	<b>360,0</b>			<b>5,00%</b>
PP 1	Practical Training*	6,0	180,0			
PP 2	Pre-graduation Practice*	6,0	180,0			
<b>3</b>	<b>Attestation*</b>	<b>6,0</b>	<b>180,0</b>			<b>2,50%</b>
<b>4</b>	<b>Optional educational components</b>	<b>70,0</b>	<b>2100,0</b>			<b>29,17%</b>
<b>4.1</b>	<b>Profile training</b>	<b>26,0</b>	<b>780,0</b>			<b>37%</b>
<b>4.1.1</b>	<b>Profiled discipline package 01 "Industrial electronics"</b>	<b>26,0</b>	<b>780,0</b>			
OP 1.1	Solid-State Electronics	5,0	150,0	3		<b>128</b>
OP 1.2	Fundamentals of Electronic Equipment	5,0	150,0	4		<b>128</b>
OP 1.3	Computer Design of Electronic Devices	5,0	150,0	5		<b>128</b>
OP 1.4	Power Electronics	5,0	150,0	6		<b>128</b>
OP 1.5	Theory of Automatic Regulation	6,0	180,0	7		<b>128</b>
<b>4.1.2</b>	<b>Profiled discipline package 02 "Biomedical electronics"</b>	<b>26,0</b>	<b>780,0</b>			
OP 2.1	Physical Basis of Electronic Equipment	5,0	150,0	3		<b>128</b>
OP 2.2	Anatomy and Biophysical Processes	5,0	150,0	4		<b>128</b>
OP 2.3	Electrotechnical Materials and Electronic Components in Medicine	5,0	150,0	5		<b>128</b>
OP 2.4	Functional Diagnostics	5,0	150,0	6		<b>128</b>
OP 2.5	Diagnostic Devices and Systems	6,0	180,0	7		<b>128</b>
<b>4.2</b>	<b>Optional student disciplines of the profile preparation according to the list</b>	<b>32,0</b>	<b>960,0</b>			<b>46%</b>
<b>4.3</b>	<b>Optional student disciplines from the general university catalog of disciplines</b>	<b>12,0</b>	<b>360,0</b>			<b>17%</b>
OD 1	Discipline 1	4,0	120,0		5	
OD 2	Discipline 2	4,0	120,0		6	
OD 3	Discipline 3	4,0	120,0		7	
	<b>Total for education period</b>	<b>240,0</b>	<b>7200,0</b>			