

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY
TECHNOLOGY AND DESIGN

**APPROVED BY THE SCIENTIFIC
COUNCIL**

**Chairman of the Academic Council of
KNUTD**

_____ **Ivan GRISHCHENKO**

(Minutes of _____ 2022 № _____)

EDUCATIONAL AND PROFESSIONAL PROGRAM

Mechatronics and robotics

Level of higher education ___ second (master's)

Degree of higher education _____ Master

Field of knowledge ___ 13 Mechanical engineering

Specialty ___ 131 Applied Mechanics

Qualification ___ Master of Applied Mechanics

Kyiv 2022

LETTER OF APPROVAL

Educational and professional program Mechatronics and robotics

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Vice-rector for scientific and pedagogical activities (educational activities)

(date) (signature) Oksana MORGULETS

Approved by the Academic Council of the Faculty mechatronics and computer technology

Minutes of " __ " ____ 202__ № __

Dean of the Faculty mechatronics and computer technology

(date) (signature) Volodymyr PAVLENKO

Discussed and recommended at the meeting of the department applied mechanics and machines

Minutes of ____ ____ 2021 21 ____

Head of Department applied mechanics and machines

(date) (signature) Aleksander MANOILENKO

Guarantor of the educational program

(date) (signature) **Bronislav ORLOVSKY**

Entered into force by order of KNUTD from " __ " ____ 202_ year № ____.

PREFACE

DEVELOPED: Kyiv National University of Technology and Design

DEVELOPERS:

Guarantor of Education Orlovsky Bronislav Vikentiyovych Ph.D., Professor, Professor of Applied Mechanics and Machines, Kyiv National University of Technology and Design

Members of the working group:

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Bezugly Oleksandr Mykolayovych, student of the Faculty of Mechatronics and Computer Technologies, Kyiv National University of Technology and Design

REVIEWS OF EXTERNAL STAKEHOLDERS:

- 1) Selivonchyk IS, General Director of MTK LLC, Ph.D.
- 2) Trunov DA Director of Technopolis Engineering Company
- 3) Ivanova LI Director of DANA-FASHION LLC
- 4) Egorov VV, Director of Legpromengineering LLC, Ph.D.
- 5) Doshchenko MA , Director of MR ENGINEERING LLC
- 6) Korchak VP, Director of PJSC "TexTemp"
- 7) Nenno DO design engineer SELTON LLC

1. Profile of the educational and professional program Mechatronics and Robotics

1 - General information	
Full name of the institution of higher education and structural unit	Kyiv National University of Technology and Design. Department of Applied Mechanics and Machines.
Degree of higher education and qualification in the original language	Level of higher education - second (master's) Degree of higher education - master Field of knowledge - 13 Mechanical Engineering Specialty - 131 Applied Mechanics
Type of diploma and scope of educational program	Master's degree, single, 90 ECTS credits
Availability of accreditation	Certificate of accreditation of the educational program from 12.12.20. № 994
Cycle / level	The National Qualifications Framework of Ukraine is the seventh level.
Prerequisites	Bachelor degree.
Language (s) of instruction	Ukrainian
Term of the educational program	Until July 1, 2026
Internet address of the permanent post of the description of the educational program	http://knutd.edu.ua/ekts/
2 - The purpose of the educational program	
<p>Training of specialists with deep knowledge, as well as basic and professional competencies in the field of mechanical engineering, aimed at gaining in-depth knowledge of design and maintenance of mechatronic and robotic systems with wide access to employment and light industry.</p> <p><i>The main goals of the program are to train capable professionals design new models of technical systems using the latest mathematical products, engineering systems of computer-aided design and 3D modeling systems, as well as maintain and repair equipment and facilities of various industries.</i></p>	
3 - Characteristics of the educational program	
Subject area	<p>The program is focused on the formation of applicants for competencies to acquire deep knowledge, skills and abilities in the specialty.</p> <p>Compulsory educational components - 73%, with them: general training - 4.5%, vocational training - 36%, practical training - 23%, learning a foreign language - 4.5%, diploma design - 32%. Disciplines of free choice of students - 27% are selected from the university catalog in accordance with the approved procedure at the University.</p>
Orientation of the educational program	Educational and professional training for a master's degree.
The main focus of the educational program	Emphasis is placed on the formation and development of professional competencies in the field of mechanical engineering, related to mechatronic and robotic systems, used in the field of light industry; study of theoretical and methodological provisions, organizational and practical tools.
Features of the educational program	The program consists in deepening theoretical, special practical and research training, summarizing the results of research, design decisions and is performed in an active research environment aimed at the design, operation and maintenance of machine structures, equipment equipped with mechatronic and robotic means, system complexes used in light industry.
4 - Suitability of graduates for employment and further study	
Suitability for employment	The graduate is suitable for employment in enterprises, organizations and institutions operating in the field of mechanical engineering and light industry in the following positions: design engineer (mechanic),

	technological engineer (mechanic), mechanical engineer, researcher, teacher, engineer complete set of equipment, engineer for mechanization and automation of production processes; engineer of mechanization of labor-intensive processes.	
Further training	Lifelong learning to improve professional, scientific and other activities. Possibility to continue training according to the educational-scientific program of the third (educational-scientific) level of higher education (doctor of philosophy).	
5 - Teaching and assessment		
Teaching and learning	Student-centered and problem-oriented learning, learning through research, undergraduate practice and self-study are used. The system of teaching methods is based on the principles of purposefulness, binary - active direct participation of research and teaching staff and students of higher education. Forms of organization of the educational process: lecture, practical, laboratory classes, practical training, independent work, consultation, development of professional projects (works).	
Evaluation	IStests, tests, tests, project work, presentations, reports.	
6 - Program competencies		
Integral competence(IR)	Ability to solve complex problems and problems in applied mechanics or in the learning process, which involves research and / or innovation and is characterized by uncertainty of conditions and requirements in the engineering industry of the fashion industry.	
General competencies (GC)	GC 1	Ability to identify, pose and solve engineering and scientific-applied problems.
	GC 2	Skills / Ability to use information and communication technologies.
	GC 3	Ability to generate new ideas (creativity).
	GC 4	Ability to develop and manage projects.
	GC 5	Ability to communicate with representatives of other professional groups of different levels (with experts from other fields of knowledge / economic activities).
	GC 6	Ability to communicate in a foreign language.
	GC 7	Ability to learn and master modern knowledge.
	GC 8	Ability to apply specialized conceptual knowledge of the latest methods and techniques of design and research of structures, machines and / or processes in the field of mechanical engineering.
Professional competencies (PC)	PC 1	Ability to critically analyze and predict the performance of new and existing mechanical and technological systems, machines, materials and production processes of mechanical engineering based on knowledge and use of modern analytical and / or computerized methods and techniques.
	PC 2	Ability to apply appropriate methods and resources of modern engineering to find optimal solutions to a wide range of engineering problems using modern approaches, forecasting methods, information technology and subject to existing limitations in terms of incomplete information and conflicting requirements.
	PC 3	Ability to apply appropriate mathematical, scientific and engineering methods, information technology and applied computer software to solve engineering and scientific problems in applied mechanics.
	PC 4	Ability to describe, classify and model a wide range of technical

		objects and processes based on a deep knowledge and understanding of mechanical theories and practices of mechanical engineering, as well as basic knowledge of interdisciplinary sciences / related sciences.
	PC 5	Ability to work independently and function effectively as a group leader.
	PC 6	Ability to clearly and unambiguously convey their own conclusions, knowledge and explanations to professionals and non-specialists, including in the teaching process.
7 - Program learning outcomes (PLO)		
Knowledge and understanding:		
PLO 1	Know the methodology, methods and techniques of development and production of a new type of product, in particular at the stages of research and development and / or development of technological support for its manufacturing processes.	
PLO 2	Know the theoretical knowledge and practical skills of using modern methods of finding the optimal parameters of technical systems by means of systems analysis, mathematical, simulation and computer modeling, including in conditions of incomplete and inconsistent information.	
Application of knowledge and understanding (skills):		
PLO 3	Be able to perform modeling, static and dynamic analysis of structures, mechanisms, materials and processes at the design stage using modern computer systems.	
PLO 4	Apply specialized conceptual knowledge of the latest methods and techniques of design, analysis and research of structures, machines and / or processes in the field of mechanical engineering and related fields of knowledge;	
PLO 5	Be able to design, prepare production and operate products using automatic life cycle support systems.	
PLO 6	Master modern knowledge, technologies, tools and methods, in particular through independent study of professional literature, participation in scientific, technical and educational activities;	
PLO 7	Apply automation systems to perform research, design work, technological training and engineering analysis in mechanical engineering;	
PLO 8	Be able to improve the operation of facilities and processes of industrial engineering based on automatic control systems.	
PLO 9	Develop and put into production new types of products, in particular to perform research and development work and / or develop technological support for the process of their manufacture;	
PLO 10	To use modern methods of optimization of parameters of technical systems by means of system analysis, mathematical and computer modeling, in particular under conditions of incomplete and contradictory information;	
PLO 11	Develop, implement and evaluate innovative projects taking into account engineering, legal, environmental, economic and social aspects;	
PLO 12	Organize the work of the group in the implementation of tasks, complex projects, research, understand the work of others, give clear instructions;	
PLO 13	Search for the necessary information in scientific and technical literature, electronic databases and other sources, assimilate, evaluate and analyze this information.	
Formation of judgments:		
PLO 14	Clearly and unambiguously present the results of research and projects, communicate their own conclusions, arguments and explanations in state and foreign languages orally and in writing to colleagues, students and representatives of other professional groups of different levels;	
PLO 15	Independently set and solve problems of an innovative nature, argue and defend the results obtained and decisions made;	
8 - Resource support for program implementation		

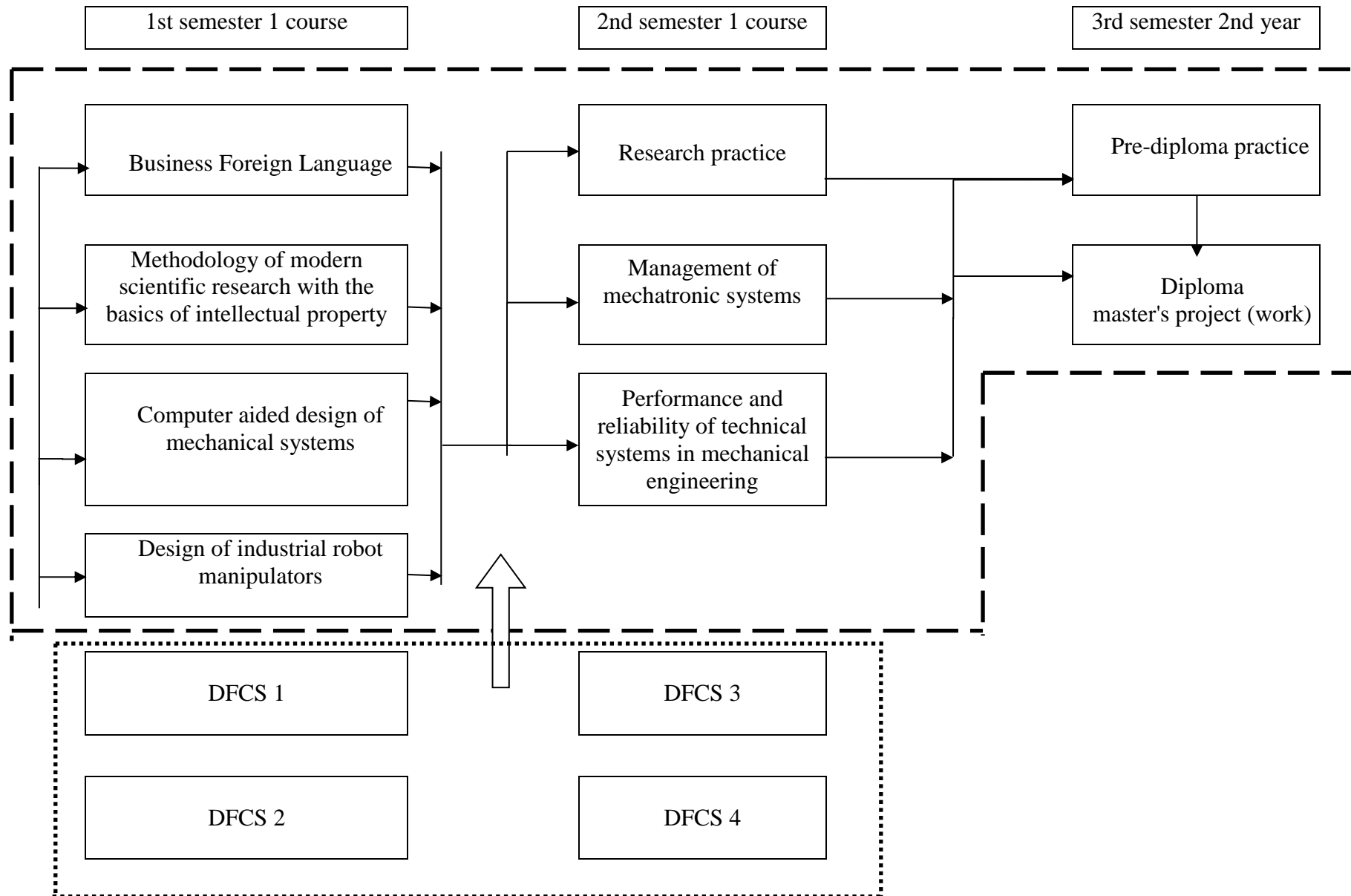
Staffing	All scientific and pedagogical workers who provide the educational program on qualification, correspond to a profile and a direction of the educational components which are taught; have the necessary experience of pedagogical work and experience of practical work. In the process of organizing training, professionals with experience in research / management / innovation / creative work and / or work in the specialty are involved.
Logistics	Logistics allows to fully ensure the educational process throughout the training cycle of the educational program. The condition of the premises is certified by sanitary and technical passports that comply with current regulations.
Information and educational and methodological support	The program is fully provided with an educational and methodological complex of all components of the educational program, the availability of which is presented in the modular environment of the educational process of the University.
9 - Academic mobility	
National credit mobility	Provides for the possibility of academic mobility for some components of the educational program, providing the acquisition of general and / or professional competencies.
International credit mobility	The program develops prospects for participation and internships in research projects and academic mobility programs.
Training of foreign applicants for higher education	Training of foreign applicants for higher education is carried out according to accredited educational programs.

2. The list of components of the educational-professional program and their logical sequence

2.1 List of components of the educational-professional program of the second (master's) level of higher education

Code	Components of the educational program (academic disciplines, term papers (projects), practices, qualification work)	Number of loans	Form of final control
1	2	3	4
Mandatory components of the educational program			
General training cycle			
OK 1	Business Foreign Language	3	exam
OK 2	Methodology of modern scientific research with the basics of intellectual property	3	test
Total from the cycle		6	
Cycle of professional training			
OK 3	Design of industrial robots-manipulators	6	exam
OK 4	Computer aided design of mechanical systems	6	exam
OK 5	Management of mechatronic systems	6	exam
OK 6	Performance and reliability of technical systems in mechanical engineering	6	exam
OK 7	Research practice	6	test
OK 8	Pre-diploma practice	9	test
OK 9	Master's thesis project (work)	21	certification
Total from the cycle		60	
The total amount of required components		66	
Selective components of the educational program			
DFCS	Disciplines of free choice of the student	24	test
TOTAL VOLUME OF THE EDUCATIONAL PROGRAM		90	

2.2. Structural and logical scheme of master's training educational and professional program Mechatronics and Robotics in the specialty 131 Applied Mechanics



3. Form of certification of applicants for higher education

Forms of certification of applicants for higher education	Certification of a graduate of an educational program is carried out in the form of public defense of a master's thesis project (work).
Document of higher education	Master's degree with educational qualification: Master of Applied Mechanics of the educational program Mechatronics and Robotics.

4. Matrix of correspondence of program competencies to the components of the educational-professional program

	GC 1	GC 2	GC 3	GC 4	GC 5	GC 6	GC 7	GC 8	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6
OK1					+	+			+					+
OK2	+		+				+							
OK3		+		+					+	+				
OK4			+	+				+	+		+	+		
OK5		+						+	+	+	+	+		
OK6										+				
OK7							+	+	+	+	+		+	+
OK8					+					+	+		+	+
OK9	+	+	+	+				+	+		+	+		

5. Matrix for providing program learning outcomes with relevant components of the educational-professional program

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PLO 13	PLO 14	PLO 15
OK1						+								+	
OK2	+					+				+	+	+			
OK3	+	+	+	+	+		+	+	+						
OK4		+	+	+			+		+	+					
OK5		+			+			+	+						
OK6	+	+		+					+						
OK7	+	+				+				+		+	+		+
OK8												+	+	+	+
OK9			+	+	+	+	+	+	+	+	+		+	+	+