

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE  
LVIV POLYTECHNIC NATIONAL UNIVERSITY



"APPROVED"  
Rector  
Lviv Polytechnic  
National University

/ Y. Bobalo /  
"31" May 2021 y.

**EDUCATIONAL - SCIENTIFIC PROGRAM**  
*(English version)*

**third (educational and scientific) level of higher education**

**in the specialty 131 *Applied mechanics***

**fields of knowledge 13 *Mechanical engineering***

**Qualifications: Doctor of Philosophy in the specialization: *Applied Mechanics***

Reviewed and approved by  
Academic Council of the University  
(Protocol No. 74  
from "25" May 2021 p.)

Lviv 20221.

Developed by the working group on specialty 131 "Applied Mechanics" in the composition:

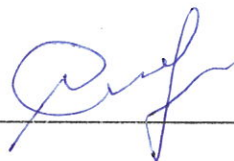
**Head of the working group (Guarantor):**

Stupnytskyy V. Doctor of Technical Sciences, Professor, Head of Department of Robotics and Integrated Mechanical Engineering Technologies (RIME)

**Members:**

Lanets O. Doctor of Technical Sciences, Professor, Director of IMET  
Hrytsay I. Doctor of Technical Sciences, Professor, Professor of RIME Department  
Maximovich O. Doctor of Technical Sciences, Professor, Head of the OGEW Department  
Kuzio I. Doctor of Technical Sciences, Professor, Professor of RIME Department  
Hurey I. Doctor of Technical Sciences, Professor, Professor of RIME Department  
Gursky V. Doctor of Technical Sciences, Associate Professor of RIME Department  
Sholoviy Y. Ph.D., Associate Professor, Associate Professor of RIME Department  
Borovets V. Ph.D., Associate Professor, Associate Professor of RIME Department  
Dzyubik A. Candidate of Technical Sciences, Associate Professor, Associate Professor of the OGEW Department  
Gachkevich O. Doctor of Physical and Mathematical Sciences, Professor, Head of the Department "Theory of Physical and Mechanical Fields" of the Institute of Mechanical Engineering named after Y. Podstryhach NAS of Ukraine  
Mokryy O. Doctor of Technical Sciences, Scientific Researcher of the Department of Acoustic Methods and Technical Diagnostics of the Karpenko Physical and Mechanical Institute of NAS of Ukraine  
Dmytriv T. postgraduate student of the department of RIME  
Kanivets O. Chairman of the board and trade union of students and graduate students of IMET

**Guarantor of ESP**



**Stupnytskyy V.**

Approved and put into effect by order of the Rector of Lviv Polytechnic National University dated "2" June 2021 p. № 325-1-20.

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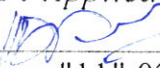
**LETTER OF AGREEMENT**  
the educational and scientific program


Level of higher education  
Field of knowledge  
Specialty  
Qualification

third (educational and scientific)  
13 *Mechanical engineering*  
131 *Applied mechanics*  
Ph.D.


**APPROVED**

Scientific and methodological  
commission of specialty 131 *Applied  
Mechanics*  
Protocol No. 1/21  
from "11" 02. 2021.

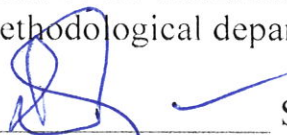
Chairman of the scientific-methodical  
commission (SMC) of the specialty  
131 *Applied mechanics*  
 I. Kuzio  
from "11" 02. 2021


Director of the Institute of Mechanical  
Engineering  
and transport  
 O. Lanets  
from "18" 02. 2021


**RECOMMENDED**

Scientific and methodological council of  
the University  
Protocol No. 56  
from "13" 05. 2021  
Chairman of the scientific and  
methodological council of the University  
 A. Zagorodniy

**AGREED**

Head of the educational and  
methodological department  
 Sviridov V.  
from "12" 05. 2021

Vice Rector for Scientific Research  
 I. Demydov  
from "26" 02. 2021

Vice-Rector for Graduate Education  
 O. Davydchak  
from "12" 05. 2021

# 1. PROFILE OF THE Ph.D. PROGRAM IN THE SPECIALTY 131 "APPLIED MECHANICS"

<b>1 - General information</b>	
<b>Full name of the higher education institution and structural unit</b>	Lviv Polytechnic National University
<b>Full name of the qualification in the original language</b>	Doctor of Philosophy in the field of "Mechanical Engineering" in the specialty 131 "Applied Mechanics" (by types) Doctor of Philosophy in Mechanical Engineering by Specialty of Applied mechanics (by types)
<b>The official name of the educational and scientific program</b>	"Applied Mechanics" "Applied Mechanics"
<b>Type of diploma and scope of the educational and scientific program</b>	Diploma of Doctor of Philosophy, single, 43 ECTS credits of the educational component of the educational and scientific program, the term of the educational component of the program is 2 years
<b>Availability of accreditation</b>	Accredited
<b>Cycle/level</b>	NQF of Ukraine - level 8, FQ-EHEA - third cycle, EQF-LLL - level 8
<b>Prerequisites</b>	Level of higher education "Master"
<b>Language(s) of instruction</b>	Ukrainian language
<b>Basic concepts and their definitions</b>	The educational and scientific program uses the basic concepts and their definitions following the Law of Ukraine "On Higher Education" dated 01.07.2014 No. 1556-VII as amended and supplemented, the Law of Ukraine "On Scientific and Scientific-Technical Activity" dated 26.11.2015 No. 848-VIII as amended and supplemented, the Procedure for the preparation of applicants for the degree of Doctor of Philosophy and Doctor of Science in higher education institutions (scientific institutions), approved by the Resolution of the Cabinet of Ministers of 23.03.2016 No. 261
<b>2 - The purpose of the educational program</b>	
	To provide theoretical knowledge and practical skills in the field of "Mechanical Engineering" in the specialty 131 "Applied Mechanics" (by type), to develop professional, philosophical and linguistic competencies, to form universal skills of a researcher sufficient for conducting and successful completion of scientific research and further professional and scientific activity and employment in the specialty
<b>3 - Characteristics of the educational program</b>	
<b>Subject area (field of knowledge, specialty)</b>	Field of knowledge - Mechanical engineering; specialty 131 "Applied mechanics" (by type)
<b>Orientation of the educational and scientific program</b>	The educational and scientific program is based on the normative provisions and results of modern scientific research in the field of mechanical engineering, dynamics and strength of machines, engineering technology, welding and diagnostics of metal structures, which solve such problems as: design, calculation, manufacture, operation and repair of mechanisms and machines, creation of rational structures, improving the quality and efficiency of their work; development and improvement of technological processes for the manufacture of machine parts, technological equipment, research of dynamic processes in energy, technological, transport and other

	machines, devices and apparatus, creation of methods for assessing their structural strength, durability and reliability at the stages of design, production and operation and directs the applicant to solve urgent problems and problems in the field of mechanical engineering
<b>The main focus of the educational and scientific program and specialization</b>	The educational and scientific program provides general scientific, professional, and linguistic competencies and universal skills of the researcher, as well as in-depth knowledge in the chosen specialty. <b>Keywords:</b> mechanical engineering, applied mechanics, English language, philosophy, methodology, pedagogy, scientific foundations, system analysis, mechanical engineering, machine design, dynamic processes, structural strength, mechanical engineering technology, welding, diagnostics.
<b>Features of the program</b>	The educational component of the program is implemented during 4 semesters, lasting 43 cre. It consists of disciplines in the corresponding 3 cycles, which provide: general scientific and professional competencies, universal skills of the researcher, and disciplines of the applicant's free choice.
<b>4 - Suitability of graduates to employment and further education</b>	
<b>Suitability for employment</b>	Jobs in research institutes, higher educational institutions, scientific centers, research and production companies, and enterprises of mechanical engineering profile scientific, scientific-pedagogical, scientific-production, and managerial positions in the field of mechanical engineering.
<b>Further training</b>	Advanced training in research institutes, leading universities of Ukraine and abroad, scientific design and technological departments of industrial enterprises of mechanical engineering and instrumentation. Implementation of the scientific program of the fourth (scientific) level of higher education for obtaining the degree of Doctor of Science
<b>5 - Teaching and assessment</b>	
<b>Teaching and learning</b>	A combination of lectures, practical classes, consultations, independent work on solving problems, consultations with teachers, and preparation of the theoretical part of the dissertation of the Doctor of Philosophy (Ph.D.).
<b>Evaluation</b>	Written and oral exams, tests, and presentations of the results of dissertation research, and defense of dissertation work with the participation of scientific and pedagogical workers from other universities and scientific institutions of the NAS of Ukraine.
<b>6 - Program competencies</b>	
<b>Integral competence (INT)</b>	The ability to solve complex scientific and applied problems and make decisions on the use of the results of these studies in the practical activities of enterprises/institutions in the field of mechanical engineering, or in the educational processes of universities and research programs of research institutes, which involves the application of theories and methods of applied mechanics and are characterized by complexity and uncertainty.
<b>General competencies (GC)</b>	1. <i>Research ability.</i> Ability to form a systematic scientific outlook, professional ethics, and general cultural outlook. Ability to initiate and perform (individually or in a research group) scientific research that leads to new knowledge in the field of mechanical engineering of such quality that meets the requirements of reviewers at the national and international levels. Ability to search and analyze information from - various scientific domestic and foreign sources. Ability to effectively use scientific practice various theories in the field of scientific and

applied research in the specialty of "Applied Mechanics". Ability to solve scientifically and applied problems and make appropriately informed decisions, to form new scientific ideas and current problems in the field of mechanical engineering, and to choose appropriate directions and appropriate methods for their implementation, taking into account available resources. Ability to use information technologies and computer programs in the field of mechanical engineering (formation of reasonable references to literature sources, etc.)

2. *Group work.* Ability to work in a large scientific group, understanding the responsibility for the results of work, as well as taking into account budgetary costs and personal commitments. Communicate research and innovation results to colleagues.

3. *Creativity.* The ability to produce new scientific and scientific-applied ideas, to show creativity, and ability to systematic thinking in achieving scientific goals.

4. *Communication skills.* Ability to communicate effectively with specialized and general audiences, as well as to present complex information conveniently and understandably orally and in writing, using appropriate technical vocabulary and methods. Ability to communicate with colleagues in the field of mechanical engineering about scientific advances, both at a general level and the level of a scientific professional.

5. *International outlook.* Acquisition of language competencies sufficient to present and discuss scientific results in a foreign language in oral and written form. Ability to work in a large international group, to respect national and cultural traditions, and ways of work of other members of the group.

6. *Management abilities.* Acquisition of competence in effective management of scientific projects and preparation of proposals for funding of scientific developments. Ability to work under time and resource constraints, as well as to motivate and manage the work of others to achieve goals. Ability to demonstrate a significant range of leadership skills, methods, tools, and practices related to the field of study. Ability to analyze and synthesize, which allows them to formulate conclusions for various types of complex management tasks, to plan, analyze, monitor, and evaluate their work and the work of others. Ability to effect various theories in practice in the management of science and the field of business administration. Acquiring skills in presenting the results of scientific work in Ukrainian and foreign languages with the use of modern information technologies.

7. *Teaching abilities.* Acquisition of universal skills of a researcher, in particular, organization and conduct of training sessions, application of modern information technologies (work with virtual training environment (VLE), Microsoft Teams, Zoom, etc.). Competence to teach undergraduate students in practical and laboratory classes.

8. *Ethical obligations.* Demonstrate commitment to ethical obligations and ethical behavior in scientific research. Ability to show awareness of equal opportunities and gender issues. Proper understanding and respect for multiculturalism and difference.

9. *Critical and self-critical abilities.* Participate in critical dialogue, conduct and initiate complex social processes in their professional field. Ability to be critical and self-critical to understand the factors that have a positive or negative impact on communication and the ability to

	<p>identify and take into account these factors in specific communication situations.</p> <p>10. <i>Social abilities.</i> Ability to learn, perceive the acquired knowledge in the subject area, and integrate it with existing knowledge. Ability to plan and manage time. Ability to act with social responsibility and civic consciousness. Determination and perseverance in the performance of assigned tasks and responsibility for the quality of work performed. Orientation to the protection and preservation of the natural environment. Ability to adapt and work in new situations, evaluate and maintain the quality of work performed, motivate people and move towards a common goal.</p>
<p><b>Professional competencies of the specialty (PC)</b></p>	<p>1. <i>Research abilities.</i> Acquiring in-depth knowledge in the field of applied mechanics, in particular, mastering the basic concepts of mechanical engineering, understanding the theoretical and practical problems facing modern mechanical engineering, the history of development, and the current state of scientific research in this field. Ability to perform original research in the field of mechanical engineering and achieve scientific results that create new knowledge, paying special attention to current tasks/problems and using the latest scientific methods. Possess knowledge in the field of mechanical engineering and basic sciences necessary for mastering the disciplines that provide knowledge in the chosen specialty and disciplines of free choice of the graduate student.</p> <p>2. <i>Technological abilities.</i> Competence in the use of scientific equipment and technologies related to mechanical engineering. Ability to develop technological documentation in the field of mechanical engineering during the implementation of production technologies. Ability to master the generally accepted technical terminology in mechanical engineering, including in a foreign language following the State Standards of Ukraine and ISO standards.</p> <p>3. <i>Design abilities.</i> Competence in designing mechanical engineering equipment and designing experimental facilities in general. Possess scientific concepts, theories, and methods necessary to understand the principles of creating equipment in the field of mechanical engineering.</p> <p>4. <i>Ability to analyze data.</i> Ability to analyze the data of theoretical and experimental research in the field of applied mechanics, which can be large and require the use of powerful computing resources. Acquisition of skills in the registration of intellectual property rights</p> <p>5. <i>Ability to criticize and evaluate.</i> Ability to interpret experimental results and participate in discussions with experienced mechanical scientists regarding the scientific significance and potential implications of the results.</p> <p>6. <i>Teaching abilities.</i> Ability to organize scientific and pedagogical activities in the field of applied mechanics. Ability to apply scientific and pedagogical knowledge and practical skills to solve scientifically and applied problems in the field of mechanical engineering. Ability to identify, classify and describe the work related to scientific and pedagogical activities in the field of applied mechanics by using analytical methods and methods of modeling production processes in mechanical engineering.</p> <p>7. <i>Management abilities.</i> Ability to find out cause and effect relationships, analyze and summarize external and internal management information for planning, organizing, motivating employees, and</p>

	<p>monitoring the activities of subordinates working in the field of mechanical engineering.</p> <p>8. <i>Social abilities.</i> Possess knowledge of the basics of labor protection, industrial sanitation, and fire safety in the organization of engineering production technologies. Ability to understand and take into account social, environmental, ethical, and economic aspects that affect the formation of current and future decisions. Thoroughly investigate and comprehend social norms and relationships within their specific field of study and take action to change them. Ability to conduct business communications, knowledge, and understanding of the scientific specialty to determine the structure of scientific research in the field of mechanical engineering.</p>
<b>7 - Program learning outcomes</b>	
<b>Knowledge (KC)</b>	<ol style="list-style-type: none"> <li>1. Ability to demonstrate in-depth knowledge of mechanical engineering, dynamics, and strength of machines, mechanical engineering technology, weighing and diagnostics of metal structures, which will enable critical analysis of the situation in the field of mechanical engineering;</li> <li>2. Ability to demonstrate in-depth knowledge in the chosen field of research for the successful organization and conduct of research in applied mechanics, successful public defense of their results at scientific seminars and specialized scientific councils;</li> <li>3. Ability to demonstrate knowledge of modern achievements of innovative technologies in mechanical engineering;</li> <li>4. Ability to demonstrate an understanding of the impact of technical solutions in a societal, economic, and social context.</li> </ol>
<b>Skills (SC)</b>	<ol style="list-style-type: none"> <li>1. To search, analyze and critically evaluate scientific and technical information from various sources, including foreign ones;</li> <li>2. Apply knowledge and understanding to solve problems of synthesis and analysis of elements and systems characteristic of the chosen field of research;</li> <li>3. Investigate and model phenomena and processes in complex mechanical systems;</li> <li>4. Apply a systematic approach, integrating knowledge from other disciplines and taking into account non-technical aspects, when solving theoretical and applied problems of the chosen field of research;</li> <li>5. Combine theory and practice, as well as make decisions and develop a strategy for solving scientific and applied problems, taking into account universal human values, public, state, and industrial interests;</li> <li>6. Work effectively both individually and as part of a team;</li> <li>7. Independently perform experimental research and apply research skills;</li> <li>8. To assess the feasibility and possibility of applying new methods and technologies in the problems of synthesis of mechanical systems;</li> <li>9. Argue the choice of methods for solving scientific and applied problems, critically evaluate the results, and defend the decisions made;</li> <li>10. Systematically comprehend and apply creative abilities to the formation of fundamentally new ideas in the field of mechanical engineering;</li> <li>11. Critically evaluate the results of research and reasonably make and defend appropriate decisions;</li> <li>12. To use in scientific and pedagogical practice knowledge of mechanical engineering, methodological tools of knowledge, to analyze</li> </ol>



	the results of research within existing theories, to draw reasonable conclusions.
<b>Communication (COM)</b>	1. Ability to communicate effectively at professional and social levels, including in a foreign language; 2. Ability to present and discuss the results obtained and to transfer the acquired knowledge.
<b>Autonomy and responsibility (A&amp;R)</b>	1. Ability to adapt to new conditions, make decisions independently and initiate original research and innovation complex projects; 2. Ability to realize the need for lifelong learning to deepen the acquired and acquire new professional knowledge; 3. Ability to take responsibility for the work performed and achieve the set goal in compliance with the requirements of professional ethics. 4. Ability to demonstrate an understanding of basic environmental, health and safety principles and their application.
<b>8 - Resource support of the program implementation</b>	
<b>Specific characteristics of staffing</b>	100% of the teaching staff involved in teaching professionally oriented disciplines have academic degrees in the specialty
<b>Specific characteristics of logistical support</b>	Use of modern application programs: Deform, Delcam, AutoCAD, SolidWorks, Pro/Engineer, and MatLab for equipment design, modeling and calculation of technical systems, and mathematical processing of research results.
<b>Specific characteristics of information and methodological support</b>	Using the virtual learning environment of Lviv Polytechnic National University and the author's theoretical and scientific and applied developments of the faculty.

<b>9 - Academic mobility</b>	
(Regulated by the Resolution of the Cabinet of Ministers of Ukraine No. 579 "On Approval of the Regulation on the Procedure for Exercising the Right to Academic Mobility" of August 12, 2015)	
<b>National credit mobility</b>	Based on bilateral agreements between Lviv Polytechnic National University and technical universities of Ukraine.
<b>International credit mobility</b>	Based on bilateral agreements between Lviv Polytechnic National University and higher education institutions of foreign partner countries.
<b>Training of foreign applicants for higher education</b>	It's possible

## 2. DISTRIBUTION OF THE CONTENT OF THE EDUCATIONAL AND SCIENTIFIC PROGRAM BY GROUPS OF COMPONENTS AND TRAINING CYCLES

№ n/a	Preparation Cycle	The volume of study load of a higher education applicant (credits / %)		
		Mandatory components of the educational and scientific program	Selected components of the educational and scientific program	Total for the entire term training
1	2	3	4	5
1.	The cycle of disciplines that form general scientific competencies	21/49	3/7	24/56

	and universal skills of the researcher			
2.	The cycle of disciplines that form professional competencies	10/23	6/14	16/37
3.	The cycle of disciplines of free choice of the graduate student:	-	-	-
3.1	at the choice of the graduate student	-	3/7	3/7
Total for the entire period of study		31/72	12/28	43/100

### 3. LIST OF COMPONENTS OF THE EDUCATIONAL AND SCIENTIFIC PROGRAM

Discipline code	Educational component of the educational and scientific program	Semester	Sem. counter		Scope of work				Distribution by type of occupation (in hours)		
			Examination	Offset	Cred.	Hours			Lectures	Laboratory	Practical
					ECTS	Total	Audit work	Independent work.			
1	2	3	4	5	6	7	8	9	10	11	12
<b>Mandatory components of the educational component</b>											
<i>The cycle of disciplines that form general scientific competencies and universal skills of the researcher</i>											
OK 1.1	Philosophy and methodology of science	1	1		3	90	30	60	15		15
OK 1.2	Foreign language for academic purposes, part 1	1		1	4	120	60	60			60
OK 1.3	Foreign language for academic purposes, part 2	1	1		4	120	60	60			60
OK 1.4	Professional pedagogy	2		1	3	90	30	60	15		15
OK 1.6	Academic entrepreneurship	3		1	4	120	30	90	15		15
OC 1.7	Pedagogical practice	3		1	3	90	30	60			30
<b>Total per cycle</b>					<b>21</b>	<b>630</b>	<b>240</b>	<b>390</b>			
<i>The cycle of disciplines that form professional competencies</i>											
OK 2.1	Analytical and numerical research methods in mechanical engineering	1	1		4	120	30	90	15		15
OK 2.2	Research seminar in the field of mechanical engineering	2		1	3	90	30	60			30
OK 2.3.	Research methods in applied mechanics	3		1	3	90	30	60			30
<b>Total per cycle</b>					<b>10</b>	<b>300</b>	<b>90</b>	<b>210</b>			
<b>Selected components of the educational component</b>											
<i>The cycle of disciplines that form general scientific competencies and universal skills of the researcher</i>											
WB 1.1	Business English	3		1	3	90	30	60			30
WB 1.2	Psychology of creativity and invention	3		1	3	90	30	60	15		15
WB 1.3	Management of scientific projects	3		1	3	90	30	60	15		15
WB 1.4	Technology of grant applications and patent rights	3		1	3	90	30	60	15		15
WB 1.5	Rhetoric	3		1	3	90	30	60			30
WB 1.6	Modern inventory in research activities	3		1	3	90	30	60	15		15
WB 1.7	Open scientific practices	3		1	3	90	30	60			30
WB 1.8	Academic integrity and quality of education	3		1	3	90	30	60			30
WB 1.9	Methodology of preparation of scientific publications	3		1	3	90	30	60	15		15
WB 1.10	Quality of higher education (formation of internal quality assurance systems)	3		1	3	90	30	60			30

<b>Total per cycle</b>					<b>3</b>	<b>90</b>	<b>30</b>	<b>60</b>			
<i>The cycle of disciplines that form professional competencies</i>											
WB 2.1	Physico-chemical processes and surface engineering	4	1		3	90	30	60	15		15
WB 2.2	Dynamics and strength of machines	4	1		3	90	30	60	15		15
WB 2.3	Research and modeling of processes in technological systems	4	1		3	90	30	60	15		15
WB 2.4	Theoretical and applied problems of modern methods of forming products	4	1		3	90	30	60	15		15
WB 2.5	Corrosion of metals and corrosion protection of industrial equipment	4	1		3	90	30	60	15		15
WB 2.6	Technology and materials for spraying, surfacing and tribomaterials science	4	1		3	90	30	60	15		15
WB 2.7	Applied theory of vibrations of mechanical systems	4	1		3	90	30	60	15		15
WB 2.8	Simulation methods of engineering analysis of functioning and manufacturing of mechanical engineering products	4	1		3	90	30	60	15		15
<b>Total per cycle</b>					<b>6</b>	<b>180</b>	<b>60</b>	<b>120</b>			
<b>Discipline of the free choice of the graduate student</b>											
WB 3.1	Discipline of free choice	4		1	3	90	30	60	15		15
<b>Total per cycle</b>					<b>3</b>	<b>90</b>	<b>30</b>	<b>60</b>			
<b>IN GENERAL</b>					<b>43</b>	<b>1290</b>	<b>450</b>	<b>840</b>			



## 5. MATRIX OF CORRESPONDENCE OF PROGRAM COMPETENCIES TO THE COMPONENTS OF THE EDUCATIONAL PROGRAM

	INT	GS1	GS2	GS3	GS4	GS5	GS6	GS7	GS8	GS9	GS10	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8
OK 1.1	•	•							•	•	•	•							•
OK 1.2					•	•	•						•						
OK 1.3					•	•	•						•						
OK 1.4			•		•			•	•		•					•	•		
OK 1.5							•								•			•	
OC1.6			•		•			•		•	•					•	•		
OC 2.1												•			•				
OK 2.2	•											•			•	•			
OK 2.3.	•											•	•	•	•				
WB 1.1					•	•	•						•						
WB 1.2		•		•	•					•									
WB 1.3							•								•			•	
WB 1.4		•													•				
WB 1.5			•	•	•			•									•		
WB 1.6			•				•								•			•	
WB 1.7	•	•		•	•							•							
WB 1.8								•	•							•			•
WB 1.9		•		•	•					•		•			•				
WB 1.10		•					•	•		•						•	•	•	
WB 2.1	•											•	•		•				•
WB 2.2	•											•		•	•				
WB 2.3	•											•	•		•				
WB 2.4	•											•	•		•				
WB 2.5	•											•	•	•	•				•
WB 2.6	•											•	•	•	•				
WB 2.7	•											•		•	•				
WB 2.8	•											•	•	•	•				
WB 3.1	•											•	•	•	•				

9. Stress state diagnostics and strength assessment of shell elements of structures
10. Research of dynamics, strength, and synthesis of vibration systems
11. Increasing the efficiency of automation of machine-building production and technical diagnostics of technological equipment.
12. Improving the efficiency of the design, manufacture, and operation of robotic and mechanical systems

### **III. CERTIFICATION OF POSTGRADUATE STUDENTS**

Certification of applicants for the higher education of the scientific degree of Doctor of Philosophy is carried out by a specialized academic council, permanently operating or formed for a one-time defense, based on a public defense of a scientific work in the form of a dissertation.

A prerequisite for admission to the defense is the successful completion by the graduate student of his curriculum and mandatory plagiarism check.

Applicants for the degree of Doctor of Philosophy defend their dissertations, as a rule, in a permanent specialized academic council in the relevant specialty, which operates in the higher educational institution where the postgraduate student was trained. The Academic Council of Lviv Polytechnic National University also has the right to submit to the National Agency for Quality Assurance in Higher Education documents for accreditation of a specialized academic council formed for a one-time defense or to apply to another higher education institution where a permanent specialized academic council in the relevant specialty functions.

The volume of the main text of the dissertation of applicants for the degree of Doctor of Philosophy in the specialty 131 "Applied Mechanics (by type)" is set at 4.0 - 5.0 author's sheets.

### **IV. COMPLIANCE WITH THE NORMS OF ACADEMIC INTEGRITY**

Academic supervisors and postgraduate students are obliged to strictly adhere to the established norms of academic integrity following "Regulations on Academic Integrity at Lviv Polytechnic National University (approved by the Protocol of the Academic Council of Lviv Polytechnic National University №35 of 8.09.2017)

All results of scientific research that are prepared for publication are subject to mandatory plagiarism checks. The issue of regulation of measures to guarantee academic integrity is regulated by the Order of Lviv Polytechnic National University 223-10 of 24.10.2017. Publications of postgraduate students during the preparation of dissertations for submission to a specialized academic council are also subject to additional verification following the Order of Lviv Polytechnic National University 551-1-10 of 18.10.2018.

At the meetings of the profile departments of the specialty "Applied Mechanics" the issues of ensuring academic integrity should be considered at least once a year.