

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL TECHNICAL UNIVERSITY OF UKRAINE
“IGOR SIKORSKY KYIV POLYTECHNIC INSTITUTE”

APPROVED
Academic Council of
Igor Sikorsky Kyiv Polytechnic Institute
(*Protocol № 10 dated 13.12. 2021*)
Head of the Academic Council

Mykhailo ILCHENKO

AIRCRAFT MANUFACTURING ENGINEERING

**EDUCATIONAL AND PROFESSIONAL PROGRAM
first (bachelor's) level of higher education**

Specialty:	131 Applied Mechanics
Areas of knowledge:	13 Mechanical engineering
Qualification:	Bachelor of Applied Mechanics

*Put into effect since 2022/2023 e.y.
by order of the Rector
Igor Sikorsky Kyiv Polytechnic Institute
№HOH/75/2022 dated 15.02.2022*

Київ – 2021 р

PREAMBLE

DEVELOPED by the project team:

Head of working group

Sergii Hozhii – Doctor of Technical Sciences, Associate Professor, Professor of the Department of Aircraft Manufacturing Engineering

Members of the working group:

Ruslan Borys – Ph.D., Associate Professor, Associate Professor of the Department of Aircraft Manufacturing Engineering

Viacheslav Titov – Doctor of Technical Sciences, Professor, Professor of the Department of Aircraft Manufacturing Engineering

Anton Lavrinenkov – Ph.D., Associate Professor, Acting Head of the Department of Aircraft Manufacturing Engineering

The following participated in the project group of Educational and Professional Program (EPP) developers:

– from representatives of employers:

Valerii Maievskiy – director of HR management of SE "ANTONOV"

Serhii Antoniuk – deputy chief metallurgist of SE "ANTONOV"

Hennadii Karpyshev – director of personnel and social affairs of SAHC"ARTEM"

– from graduates:

Valerii Pimanov – technical director of DB "Vektor-B"

– from higher education recipients:

Vladyslav Syrota – 1st year master's degree student, *the Dep. of AME*

Vitalii Koreva – 3rd year post graduate student, *the Dep. of AME*

Head of the scientific and methodical subcommission on the specialty:

Anton Lavrinenkov – Ph.D., Associate Professor, Acting Head of the Department of Aircraft Manufacturing Engineering

The Department of *Aircraft Manufacturing Engineering* is responsible for the preparation of higher education applicants for the educational program

AGREED:

Scientific and methodological commission of the University in the specialty 131 Applied Mechanics

Head of NMCU 131

Mykola BOBYR

(Protocol № 4 dated 08/12/2021)

Methodical Council of Igor Sikorsky Kyiv Polytechnic Institute

Deputy Head of the Methodical Council

Anatolii MELNYCHENKO

(Protocol № 2 dated 09/12/2021)

CONSIDERED:

1. Order of the Ministry of Education and Science of Ukraine dated June 20, 2019 No. 865 "About approval of the standard of higher education in the specialty 131 "Applied mechanics" for the first (bachelor's) level of higher education. <https://mon.gov.ua/ua/npa/pro-zatverdzhennyastandardu-vishoyi-osviti-za-specialnistyu-131-prikladna-mehanika-dlya-pershogo-bakalavrskogorivnya-vishoyi-osviti>

2. Regulations on the development, approval, monitoring and revision of educational programs in the Igor Sikorsky KPI. Igor Sikorsky <https://osvita.kpi.ua/node/137>

3. Comments and suggestions of stakeholders based on the results of public discussion:

SE "ANTONOV" (Academician Tupolev St. 1, 03062, Kyiv, Ukraine)

SAHC"ARTEM" (Yurii Illienko St. 2/10, 04050, Kyiv, Ukraine)

LLC "Progresstech-Ukraine" (BC 'C/ubic-Center' 3 Sholudenka St. Kyiv, Ukraine)

According to the results of the monitoring, taking into account the proposals of the participants of the educational process involved in the implementation of the educational program (OP), the proposals of graduates, employers and other external stakeholders, its renewal was carried out. The project team reviewed the balance, rationality of credit assignment, the ability of education applicants to master individual disciplines (educational components) and the OU in general when forming competencies for a certain period of study, completeness of documentary, personnel, information and methodological and other provision of the OU and compliance of the educational program with licensing conditions. In order to ensure the possibility of forming an individual educational trajectory, including through the individual choice of disciplines to the extent provided for by law, and in order to ensure compliance with the Standard of Higher Education, it was decided to update the educational and professional program "Aircraft Manufacturing Engineering" of first (bachelor's) level of higher education.

The educational program was discussed after receiving all wishes and proposals was approved at an extended meeting of the Department of Aircraft Manufacturing Engineering (Protocol № 5 09.11.2021).

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1. PROFILE OF THE EDUCATIONAL PROGRAM

1 – General information	
Full name of higher education institution and institute/faculty	National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Educational and Scientific Mechanical Engineering Institute
Higher education degree and title of qualification in the original language	The degree is a bachelor’s degree. Qualification – Bachelor of Applied Mechanics
Official name of EP	Aircraft Manufacturing Engineering
Type of diploma and volume of EP	Bachelor’s degree, single, 240 ECTS credits, term of study 3 years and 10 months
Availability of accreditation	Certificate of accreditation of the specialty ND 1192553, valid until 01/07/2023, issued by the Ministry of Education and Science of Ukraine
Cycle / Level HE	NRC of Ukraine – Level 6 QF-EHEA – First Cycle EQF-LLL – Level 6
Prerequisites	Availability of complete secondary education
Language(s) of teaching	Ukrainian
Validity period of EP	Until the next accreditation
Internet address of permanent placement of the educational program	https://osvita.kpi.ua/op https://mpm-rp.kpi.ua/op ,
2 – The purpose of the educational program	
Training of highly qualified specialists capable of solving basic scientific and technical problems in the field of applied mechanics and mechanical engineering in the conditions of sustainable innovative scientific and technical development of society and the formation of high adaptability of higher education applicants in the conditions of transformation of the labor market through interaction with employers and other stakeholders. Create conditions for comprehensive professional, intellectual, social and creative development of the individual at the highest levels of excellence in the educational and scientific environment in accordance with the development strategy of the KPI. Igor Sikorsky Kyiv Polytechnic Institute for 2020-205: https://kpi.ua/2020-2025-strategy .	
3 – Characteristics of the educational program	
Subject Area	<ul style="list-style-type: none"> – object of activity: structures, machines, equipment, mechanical and biomechanical systems and complexes, processes of their design, manufacture, research and operation; – training objectives: professional engineering activities in the field of design, production and operation of technical systems, machinery and equipment, robotics and complexes, development of technologies of mechanical engineering industries; – theoretical content of the subject area: general laws of theoretical mechanics and their applied applications, theoretical foundations of

	<p>machinery design, technologies of machine-building industries, mechanics of liquid and gases, parts of machines and structures, forecasting of operational properties of technical systems;</p> <p>– methods, methods and technologies: physical and mathematical methods for calculating statics, dynamics and stability of elements and structures; analytical, numerical and algorithmic methods of modeling kinematics and dynamics of machines, analysis of stress-deformed state of structural elements; design, 6 control, research, development of technologies for manufacturing and assembling elements of machines and structures; information technologies in engineering research, design and production; methods and means; numerical software control of technological equipment; technologies of automated mechanical engineering industries industries;</p> <p>– tools and equipment: machine tools, tools, technological and control devices, control and measuring instruments, numerical control systems, drives of machine and robotic systems</p>
EP orientation	Educational and professional.
The main focus of the EP	<p>Special education in the field of modern information technologies for the design of aviation equipment objects.</p> <p>Keywords: CAD systems, CAE systems.</p>
Features of the EP	The implementation of the program is the involvement of professionals – practitioners, industry experts, representatives of employers in classroom classes and the use of dual education
4 – Suitability of graduates for employment and further study	
Suitability for employment	<p>According to the State Classifier of Professions DK 003:2010, graduates can work in positions corresponding to the classification groups:</p> <p>3115 – Technical specialist-mechanic, 3121 – Technician-programmer.</p> <p>Types of economic activity: КВЕД ДК 003:2010</p>
Further training	The possibility of continuing training at the second (master’s) level of higher education and / or acquiring additional qualifications in the system of postgraduate education
5 – Teaching and evaluation	
Teaching and learning	The learning style is cognitive, which is based on various methods and technologies of learning. Teaching is carried out in the form of: lectures, seminars, practical classes, laboratory classes in small groups (up to 8 students), independent work with the possibility of consultations with the teacher, individual classes, the use of information and communication technologies (e-learning, online lectures, OCW, distance courses) by individual educational components.
Evaluation	Current and semester control in the form of laboratory reports, presentations, written and oral exams and the defense of the qualification work are evaluated in accordance with the Regulation on the system of evaluation of study results at the Igor Sikorsky Kyiv Polytechnic Institute for all types of classroom and non-auditory work https://osvita.kpi.ua/node/37

6 – Software competencies	
Integral competence	The ability to solve complex specialized problems and practical problems in applied mechanics, or in the learning process, which involves the use of certain theories and methods of mechanical engineering and is characterized by complexity and uncertainty of conditions.
General Competences (GC)	<p>GC1. Ability to abstract thinking, analysis and synthesis.</p> <p>GC2. Knowledge and understanding of the subject area and understanding of professional activity.</p> <p>GC3. Ability to identify set and solve problems.</p> <p>GC4. Ability to apply knowledge in practical situations.</p> <p>GC5. Ability to work in a team.</p> <p>GC6. Certainty and perseverance regarding the tasks and responsibilities taken.</p> <p>GC7. The ability to learn and master modern knowledge.</p> <p>GC8. Ability to communicate in a foreign language.</p> <p>GC9. Skills in the use of information and communication technologies.</p> <p>GC10. Skills in carrying out safe activities.</p> <p>GC11. Ability to act socially responsibly and consciously.</p> <p>GC12. Ability to search process and analyze information from different sources.</p> <p>GC13. Ability to evaluate and ensure the quality of work performed.</p> <p>GC14. The ability to realize their rights and obligations as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, human and citizen rights and freedoms in Ukraine.</p> <p>GC15. The ability to preserve and increase the moral, cultural, scientific values and achievements of society on the basis of understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technology, to use different types and forms of motor activity for active rest and conducting a healthy lifestyle.</p>
Professional competencies (PC)	<p>PC1. The ability to analyze materials, structures and processes based on the laws, theories and methods of mathematics, natural sciences and applied mechanics.</p> <p>PC2. The ability to assess the performance parameters of materials, structures and machines in operational conditions and find appropriate solutions to ensure a given level of reliability of structures and processes, including in the presence of some uncertainty.</p> <p>PC3. The ability to carry out technological and technical and economic assessment of the effectiveness of the use of new technologies and technical means.</p> <p>PC4. The ability to make the optimal choice of technological equipment, complete set of technical complexes, have basic ideas about the rules of their operation.</p> <p>PC5. The ability to use analytical and numerical mathematical methods</p>

to solve the problems of applied mechanics, in particular, to make calculations for strength, endurance, stability, durability, rigidity in the process of static and 8 dynamic load in order to assess the reliability of parts and structures of machines.

PC6. Ability to perform technical measurements, receive, analyze and critically evaluate the results of measurements.

PC7. The ability to apply computerized design systems (CAD), manufacturing (CAM), engineering research (CAE) and specialized application software to solve engineering problems in applied mechanics.

PC8. Ability to spatial thinking and reproduction of spatial objects, structures and mechanisms in the form of projection drawings and three-dimensional geometric models.

PC9. The ability to present the results of their engineering activities in compliance with generally accepted norms and standards.

PC10. The ability to describe and classify a wide range of technical objects and processes, based on a deep knowledge and understanding of basic mechanical theories and practices, as well as basic knowledge of related sciences.

PC11. The ability to identify the physical essence, regularities and parameters of the processes of plastic deformation of metals, to determine and analyze the mechanisms of material strengthening.

PC12. The ability to use the theory of plastic flow of materials to design technological processes and determine the mechanical properties of materials, taking into account the temperature conditions of the process, the rate of deformation of materials and friction.

PC13. The ability to apply knowledge of theoretical approaches to the analytical description of the stressed and deformed state of metal, the laws of plastic flow of metal under the influence of active and passive forces to solve applied problems in the processes of metal pressure treatment.

PC14. The ability to distinguish the designs of aircraft, their aggregates and systems, to determine the force load schemes of parts and assemblies of aircraft.

PC15. The ability to identify the necessary physical and mechanical properties of aircraft units, components and parts depending on their purpose and operating conditions.

PC16. The ability to determine the possibility of manufacturing parts using cold pressing methods, to develop optimal technologies for manufacturing parts in accordance with the given production seriality.

PC17. The ability to choose rational designs of die equipment, perform appropriate design calculations taking into account the specifics of production.

PC18. The ability to identify the physical essence, regularities and main parameters of basic machining processes, to define and analyze machining modes.

	<p>PC19. The ability to distinguish cutting tools according to the possibilities of forming, to determine and select their rational parameters in view of ensuring the quality of the processed surface and the productivity of the technological transition.</p> <p>PC20. The ability to determine the possibility of manufacturing parts by methods of hot deformation, to develop optimal technologies for manufacturing parts in accordance with the given production seriality and the required mechanical properties of the material of the part.</p> <p>PC21. The ability to choose rational designs of die equipment to ensure the quality parameters of the part as a result of hot deformation, to perform appropriate design calculations taking into account the specifics of production.</p> <p>PC22. The ability to develop technological processes of preparing and dieworking production of parts of aviation and rocket-space machinery using various types of forging and pressing equipment.</p> <p>PC23. The ability to develop and implement technological processes of hot deformation of elements and objects of aviation and rocket-space technology with the most efficient use of material.</p> <p>PC24. The ability to use automated design (CAD) systems of engineering research (CAE) to design and analyze the processes of hot deformation of elements and objects of aviation and rocket-space machinery.</p> <p>PC25. The ability to assign optimal materials for structural elements of aviation and rocket-space machinery.</p> <p>PC26. The ability to identify the main structural and functional materials and semi-finished products that are used in the process of designing and manufacturing aircraft structural elements, their properties, to understand the material science principles regarding the formation of the necessary states of the structure, the strength of materials and semi-finished products from them, technological aspects of ensuring the resource of modern aircraft structural elements.</p>
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7 – Programme learning outcomes

- LO1. Choose and apply to solve problems of applied mechanics suitable mathematical methods;
- LO2. Use knowledge of the theoretical foundations of liquid and gas mechanics, heat engineering and electrical engineering to solve professional tasks;
- LO3. Perform calculations on the strength, endurance, stability, durability, rigidity of machine parts;
- LO4. Evaluate the reliability of machine parts and structures in the process of static and dynamic loading;
- LO5. Carry out geometric modeling of details, mechanisms and structures in the form of spatial models and projection images and formalize the result in the form of technical and working drawings;
- LO6. Create and theoretically substantiate the designs of machines, mechanisms and their elements based on the methods of applied mechanics, general design principles, the theory of interchangeability, standard methods of calculating machine parts;
- LO7. Apply normative and reference data to control compliance of technical documentation, products and technologies with standards, technical conditions and

other regulatory documents;

LO8. Know and understand the basics of information technology, programming, practically use application software for implementation

engineering calculations, information processing and experimental results research;

LO9. Know and understand related fields (mechanics of liquid and gases, thermal engineering, electrical engineering, electronics) and be able to identify interdisciplinary connections of applied mechanics at the level necessary to fulfill other requirements of the educational program;

LO10. Know the design, methods of selection and calculation, the fundamentals of maintenance and operation of drives of machine tools and robotics equipment;

LO11. To understand the principles of the automated control systems of technological equipment, in particular microprocessor ones, to choose and use optimal means of automation;

LO12. Skills in the practical use of computerized design systems (CAD), production preparation (CAM) and engineering studies (CAE);

LO13. Evaluate the technical and economic efficiency of production;

LO14. Make the optimal selection of equipment and equipment of technical complexes;

LO15. Take into account the main factors of man-made impact on the environment and the main methods of environmental protection, labor protection and life safety when making decisions;

LO16. Communicate freely on professional issues orally and in writing in the state and foreign languages, including knowledge of special terminology and interpersonal communication skills;

LO17. To know and understand the physical essence and technological possibilities of the processes of metalworking by pressure, to be able to assign modes of the technological process of materials treatment under pressure and to determine the possibilities of optimizing the process.

LO18. To know and understand the physical and mechanical properties of plastic deformation, hardening phenomena when determining the technological parameters of cold deformation, the effect of temperature on the mechanical properties of the material, the effect of the rate of deformation in the technological calculations of pressure treatment operations.

LO19. Be able to construct plasticity diagrams and determine mechanical deformation schemes, determine energy parameters of the deformation process, determine mechanical deformation schemes for typical metal pressure treatment processes.

LO20. Know and be able to use theoretical approaches to the analytical description of the stressed and deformed state of metal, the regularity of plastic flow of metal under the influence of active and passive forces in the processes of metal pressure treatment.

LO21. Know and be able to calculate the stress-strain state, determine the load-bearing capacity of structural elements and the reliability of aviation and rocket-space systems.

LO22. Know and be able to determine the primary structure of the aircraft design and the preliminary values of the stiffness parameters of its elements; on the basis of final data on design details, create their 3D models using CAD systems and develop technical documentation that meets the requirements of standards and other regulatory documents.

LO23. Know and be able to apply the basic principles of building rational technological processes of the preparing and diecasting production of parts and the rules of technological calculations.

LO24. Know and be able to design the geometric parameters of the workpiece, which ensure the manufacture of the part according to the specified parameters, calculate the parameters of the technological process taking into account the effective use of material and the choice of

technological equipment depending on the production seriality.

LO25. To know and understand the physical essence and technological possibilities of the basic processes of mechanical treatment, to be able to assign regimes according to recommendations, to determine the possibilities of optimization, to be able to choose the optimal sequence of technological operations for obtaining a product.

LO26. To know the main types of cutting tools and their parameters, to be able to assign rational ones when solving practical problems of designing technological transitions.

LO27. Know and be able to use the principles of building rational technological processes for the production of parts using drop forging methods and the rules of technological calculations.

LO28. Know and be able to design the geometric parameters of the workpiece, which ensure the production of parts with the necessary mechanical properties of the material and the microstructure of the material, calculate the parameters of the technological process, and make a selection of technological schemes for the formation of parts.

LO29. Know and be able to use technical documentation, reference literature, standards, methods, regulatory materials in the development of the technological process of manufacturing semi-finished products and parts of engineering, aviation and rocket-space technology.

LO30. Have the skills to develop technological processes, including the use of computer-aided manufacturing design (CAD and CAE) of engineering, aviation and rocket-space engineering parts with the prediction of the stressed and deformed state of the material, defects in the geometry of the part and the structure of the material, tool resource and energy -force parameters of the process.

LO31. To know and be able to describe the structure of metals and non-metals and to know the methods of modifying their properties, to assign optimal materials for elements and systems of aviation and rocket-space technology, taking into account their structure, physical, mechanical, chemical and operational properties.

LO32. Know and be able to determine the necessary technological processes and methods of ensuring the strengthening of parts and their protection against corrosion in order to obtain the desired levels of operational properties of parts and structures, as well as to conduct a technological and technical and economic assessment of the effectiveness of using new technologies.

8 – Resource support for the implementation of the program

Staffing	In accordance with the personnel requirements for ensuring the implementation of educational activities for the appropriate level of THE approved by the Resolution of the Cabinet of Ministers of Ukraine dated 30.12.2015 № 1187 in the current version.
Material and technical support	In accordance with the technological requirements for logistical support of educational activities of the relevant level of HE approved by the Resolution of the Cabinet of Ministers of Ukraine dated 30.12.2015 № 1187 in the current version. Use of equipment for lectures in the format of presentations, network technologies, in particular using the Sikorsky distance learning platform.
Information and educational-methodical support	In accordance with the technological requirements for educational, methodological and informational support of educational activities of the relevant level of THE approved by the Resolution of the Cabinet of Ministers of Ukraine dated 30.12.2015 №1187 in the current version.

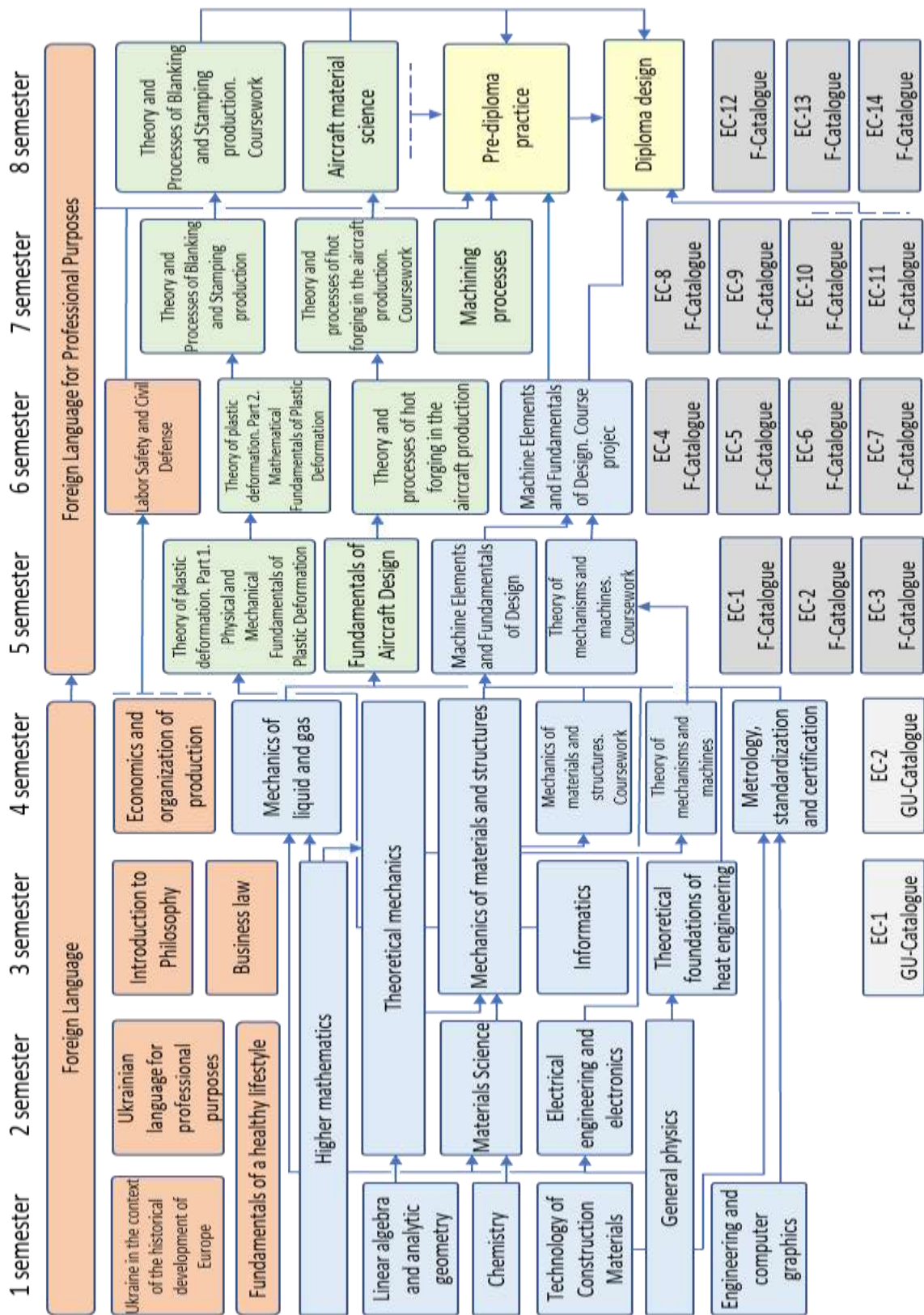
	Use of scientific and technical library Igor Sikorsky Kyiv Polytechnic Institute.
9 – Academic mobility	
National Credit Mobility	The program provides for the possibility of concluding agreements on academic mobility and double certification
International Credit Mobility	The program provides for the possibility of concluding agreements on international academic mobility (Erasmus + K1), double certification, on long-term international projects that provide for the included training of students.
Training of foreign applicants	The possibility of teaching in Ukrainian in general training groups or in English with ensuring the study of Ukrainian as a foreign language

2. LIST OF COMPONENTS OF THE EDUCATIONAL PROGRAM

Code	Components of the educational program (disciplines, course projects / works, practices, qualification work)	Number of ECTS credits	Final control form
1	2	3	4
1. Mandatory (regulatory) components of the EP			
General training cycle			
ZO 1	Ukrainian language for professional purposes	2	Test
ZO 2	Ukraine in the context of the historical development of Europe	2	Test
ZO 3	Fundamentals of a healthy lifestyle	3	Test
ZO 4.1	Foreign Language. Part 1	3	Test
ZO 4.2	Foreign Language. Part 2	3	Test
ZO 5	Economics and organization of production	4	Test
ZO 6	Labor Safety and Civil Defense	2	Test
ZO 7	Introduction to Philosophy	2	Test
ZO 8	Business law	2	Test
ZO 9.1	Foreign Language for Professional Purposes. Part 1	3	Test
ZO 9.2	Foreign Language for Professional Purposes. Part 2	3	Exam
Cycle of professional training according to the educational program			
PO 1.1	Higher mathematics. Part 1. Differential and integral calculus of functions of one variable	4,5	Exam
PO 1.2	Higher mathematics. Part 2. Differential and integral calculus of functions of many variables. Differential equations	8,5	Exam
PO 1.3	Higher mathematics. Part 3. Rows. Theory of the complex function of the variable	4	Exam
PO 2	Linear algebra and analytic geometry	3,5	Test
PO 3	Chemistry	3	Test
PO 4	Technology of Construction Materials	4,5	Exam
PO 5.1	General physics. Part 1. Mechanics. Basics of electrodynamics	5,5	Exam
PO 5.2	General physics. Part 2. Electricity and Magnetism. Optics. Atomic physics	4,5	Test
PO 6	Engineering and computer graphics	4	Test
PO 7	Materials Science	4,5	Exam
PO 8.1	Theoretical mechanics. Part 1. Statics	4,5	Exam
PO 8.2	Theoretical mechanics. Part 2. Kinematics	5	Exam
PO 8.3	Theoretical mechanics. Part 3. Dynamics	3,5	Test
PO 9	Electrical engineering and electronics	3	Test
PO 10	Informatics	4	Test
PO 11.1	Mechanics of materials and structures. Part 1. Simple load	6,5	Exam
PO 11.2	Mechanics of materials and structures. Part 2. Complex load, stability and dynamics	6,5	Exam
PO 12	Mechanics of materials and structures. Coursework	1	Test
PO 13	Theoretical foundations of heat engineering	3	Test
PO 14	Metrology, standardization and certification	4,5	Exam
PO 15	Theory of mechanisms and machines	3,5	Test
PO 16	Theory of mechanisms and machines. Coursework	1	Test
PO 17	Mechanics of liquid and gas	3,5	Test
PO 18	Machine Elements and Fundamentals of Design	6	Exam

PO 19	Machine Elements and Fundamentals of Design. Course projec	1,5	Test
PO 20.1	Theory of plastic deformation. Part 1. Physical and Mechanical Fundamentals of Plastic Deformation	4,5	Exam
PO 20.2	Theory of plastic deformation. Part 2. Mathematical Fundamentals of Plastic Deformation	4	Exam
PO 21	Fundamentals of Aircraft Design	5	Exam
PO 22	Theory and Processes of Blanking and Stamping production	6	Exam
PO 23	Machining processes	4,5	Exam
PO 24	Theory and processes of hot forging in the aircraft production	5	Exam
PO 25	Theory and Processes of Blanking and Stamping production. Coursework	1	Test
PO 26	Theory and processes of hot forging in the aircraft production. Coursework	1	Test
PO 27	Aircraft material science	4,5	Exam
PO 28	Pre-diploma Practice	6	Test
PO 29	Diploma design	6	Defense
2. Sample components of EP			
Selective components of general training			
ZV 1	Educational component 1 GU-Catalogue	2	Test
ZV 2	Educational component 2 GU-Catalogue	2	Test
Selective components of professional training			
PV 1	Educational Component 1 F-Catalogue	4	Test
PV 2	Educational Component 2 F-Catalogue	4	Test
PV 3	Educational Component 3 F-Catalogue	4	Test
PV 4	Educational Component 4 F-Catalogue	4	Test
PV 5	Educational Component 5 F-Catalogue	4	Test
PV 6	Educational Component 6 F-Catalogue	4	Test
PV 7	Educational Component 7 F-Catalogue	4	Test
PV 8	Educational Component 8 F-Catalogue	4	Test
PV 9	Educational Component 9 F-Catalogue	4	Test
PV 10	Educational Component 10 F-Catalogue	4	Test
PV 11	Educational Component 11 F-Catalogue	4	Test
PV 12	Educational Component 12 F-Catalogue	4	Test
PV 13	Educational Component 13 F-Catalogue	4	Test
PV 14	Educational Component 14 F-Catalogue	4	Test
Or			
	Certificate program “Preparation of aircraft production”	56	Tests: 14
Or			
	Certificate program “ Applied mechanics of materials plasticity”	56	Tests: 14
Total required components:		180	
Total number of selective components:		60	
The volume of educational components that ensure the acquisition of competencies of certain SHE		144,5	
THE TOTAL SCOPE OF THE EDUCATIONAL PROGRAM		240	

3. STRUCTURAL AND LOGICAL SCHEME OF THE EDUCATIONAL PROGRAM



4. FORM OF CERTIFICATION OF APPLICANTS FOR HIGHER EDUCATION

Attestation of students of higher education in the educational and professional program “Aircraft Manufacturing Engineering” specialty 131 Applied Mechanics is conducted in the form of a public defense of a qualifying bachelor’s thesis and ends with the issuance of a document of the established model on awarding a bachelor’s degree with the qualification “Bachelor in Applied Mechanics”. The qualification work is checked for plagiarism and after defense is placed in the repository of National Technical Library University for free access.

5. MATRIX OF COMPLIANCE OF SOFTWARE COMPETENCIES WITH THE COMPONENTS OF THE EDUCATIONAL PROGRAM

	Z01	Z02	Z03	Z04	Z05	Z06	Z07	Z08	Z09	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20	PO21	PO22	PO23	PO24	PO25	PO26	PO27	PO28	PO29				
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GC2																	+		+				+																+	+		
GC3																										+													+	+		
GC4																						+																	+	+		
GC5			+					+																			+												+	+		
GC6																							+																+	+		
GC7		+					+												+																				+			
GC8				+						+																																
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GC11							+																																	+		
GC12																											+			+											+	
GC13					+																																					
GC14								+																+																+		
GC15		+	+	+			+		+																															+		
PC1										+	+	+					+	+	+			+		+	+	+									+		+	+	+			
PC2																	+				+	+			+	+	+		+								+		+	+		
PC3					+																															+				+		
PC4				+									+																						+	+	+		+		+	
PC5																		+			+	+		+	+	+	+	+	+							+				+		
PC6														+										+																+	+	
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PC22																																									+	+
PC23																																									+	+
PC24																																									+	+
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PC26																																									+	+

6. MATRIX OF SOFTWARE LEARNING OUTCOMES WITH THE RELEVANT COMPONENTS OF THE EDUCATIONAL PROGRAM

	Z01	Z02	Z03	Z04	Z05	Z06	Z07	Z08	Z09	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	P013	P014	P015	P016	P017	P018	P019	P020	P021	P022	P023	P024	P025	P026	P027	P028	P029			
LO1										+	+						+		+		+			+			+											+			
LO2																			+				+			+															
LO3																				+	+								+												
LO4																				+	+						+	+												+	
LO5											+					+		+						+		+		+								+				+	
LO6																		+						+	+	+		+												+	
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