



# Pre-diploma Practice

## Syllabus of the academic discipline ( Syllabus )

### Course Details

Level of higher education	<i>First (bachelor's)</i>
Field of study	<i>16 Chemical and Bioengineering</i>
Specialty	<i>163 Biomedical Engineering</i>
Educational program	<i>Medical Engineering</i>
Course status	<i>Required</i>
Mode of study	<i>Full-time (day)</i>
Year of study / semester	<i>4th year, spring semester</i>
Course workload	<i>6 ECTS credit modules (180 hours)</i>
Forms of assessment	<i>Test</i>
Course schedule	<i>According to the schedule on the website <a href="http://rozklad.kpi.ua/">http://rozklad.kpi.ua/</a></i>
Language of instruction	<i>Ukrainian</i>
Course Instructor(s)	<i>Senior lecturer Ovcharenko Hanna Romanivna, <a href="mailto:ovcharenko.ganna@ill.kpi.ua">ovcharenko.ganna@ill.kpi.ua</a></i>
Instructor profile	<i><a href="http://bmi.fbmi.kpi.ua/department/staff-department/">http://bmi.fbmi.kpi.ua/department/staff-department/</a> <a href="http://intellect.bmi.fbmi.kpi.ua/profile/ogr">http://intellect.bmi.fbmi.kpi.ua/profile/ogr</a></i>
Course Delivery Platform	<i>Sikorsky Platform - Course "Pre-diploma Practice" Course code 7rxjtrqt</i>

### Course Programme

#### 1. Description of the academic discipline, its purpose, subject of study and learning outcomes

*Practical training of applicants for the first (bachelor's) level of higher education at the University is a mandatory component of the educational and professional program "Medical Engineering" for training specialists in specialty 163 "Biomedical Engineering" and is aimed at the applicant's acquisition of professional skills and abilities in organizations and institutions in industry 16 "Chemical and Bioengineering", including in healthcare organizations.*

*The purpose of pre-diploma practice is: preparation of a certification work (diploma work, hereinafter referred to as the thesis) for the successful completion of studies in the specialty.*

*The practice is carried out on the basis of a modern strategy of interaction between the manager/consultant and the applicant in electronic space with the aim of mastering special (professional) competencies, general competencies and obtaining program learning outcomes according to the OPP of the corresponding year of recruitment of applicants.*

***Integral competence*** (OP put into effect by the Rector's Order NOD/434/24 dated 06/10/2024):

*The ability to solve complex specialized tasks and practical problems in biomedical engineering or in the process of learning, which involves the application of certain theories and methods of chemical, biological and medical engineering, and is characterized by the complexity and uncertainty of the conditions.*

***General competencies*** (OP put into effect by the Rector's Order NOD/434/24 dated 10.06.2024):

- GC 01 Ability to apply knowledge in practical situations*
- GC 02 Knowledge and understanding of the subject area and understanding of professional activities*
- GC 03 Ability to communicate in the official national language both orally and in writing*
- GC 04 Skills in using information and communication technologies*
- GC 05 Ability to conduct research at an appropriate level*
- GC 06 Ability to search, process, and analyze information from various sources*
- GC 07 Ability to generate new ideas (creativity)*
- GC 08 Ability to make informed decisions*
- GC 09 Ability to communicate with representatives of other professional groups at different levels (experts from other fields of knowledge/types of economic activity)*
- GC 10 Skills in conducting safe activities*
- GC 11 Ability to assess and ensure the quality of work performed*

**Professional competencies (OP put into effect by the Rector's Order NOD/434/24 dated June 10, 2024):**

- FC 01 Ability to use engineering software packages for conducting research, analyzing, processing and presenting results, as well as for automated design of medical devices and systems.*
  - FC 02 Ability to provide engineering and technical expertise in the planning, development, evaluation and specification of medical equipment.*
  - FC 03 Ability to learn and apply new methods and tools for analysis, modeling, design, and optimization of medical devices and systems.*
  - FC 04 Ability to provide technical and functional characteristics of systems and devices used in medicine and biology (in prevention, diagnostics, treatment and rehabilitation).*
  - FC 05 Ability to apply physical, chemical, biological and mathematical methods in the analysis and modeling of the functioning of living organisms and biotechnical systems.*
  - FC 06 Ability to effectively use tools and methods for analysis, design, calculation, and testing in the development of biomedical products and services.*
  - FC 07 Ability to plan, design, develop, install, operate, maintain, service, control and coordinate the repair of devices, equipment and systems for prevention, diagnosis, treatment and rehabilitation used in hospitals and research institutes.*
  - FC 08 Ability to conduct research and observations on the interaction of biological, natural and artificial systems (prostheses, artificial organs, etc.).*
  - FC 09 Ability to identify, formulate, and solve engineering problems related to the interaction between living and non-living systems.*
  - FC 10 Ability to apply the principles of building modern automated production management systems for medical devices, their technical, algorithmic, information and software support.*
  - FC 11 Ability to develop, plan and conduct experiments according to given technical and biomedical methods, applying mathematical methods in analysis, modeling the functioning of living organisms, systems and processes in biology and medicine, computer processing, analysis and synthesis of the results obtained.*
  - FC 12 Ability to ensure and monitor compliance with safety and biomedical ethics when working with medical equipment.*
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- FC 01 Ability to apply engineering software packages for research, analysis, processing, and presentation of results, as well as for automated design of medical devices and systems*
  - FC 02 Ability to provide engineering and technical expertise in the planning, development, evaluation, and specification of medical equipment*
  - FC 03 Ability to study and apply new methods and tools for analysis, modeling, design, and optimization of medical devices and systems*
  - FC 04 Ability to ensure the technical and functional characteristics of systems and tools used in medicine and biology (for prevention, diagnosis, treatment, and rehabilitation)*

- FC 05 Ability to apply physical, chemical, biological, and mathematical methods in the analysis and modeling of the functioning of living organisms and biotechnical systems
- FC 06 Ability to effectively use tools and methods for analysis, design, calculation, and testing in the development of biomedical products and services
- FC 07 Ability to plan, design, develop, install, operate, maintain, service, control, and coordinate the repair of devices, equipment, and systems for prevention, diagnosis, treatment, and rehabilitation used in hospitals and research institutes
- FC 08 Ability to conduct research and observation on the interaction of biological, natural, and artificial systems (prostheses, artificial organs, etc.)
- FC 09 Ability to identify, formulate, and solve engineering problems related to the interaction between living and non-living systems
- FC 10 Ability to apply the principles of modern automated control systems in the production of medical devices, their technical, algorithmic, informational, and software support
- FC 11 Ability to develop, plan, and conduct experiments using specified technical and biomedical techniques, applying mathematical methods in the analysis and modeling of the functioning of living organisms, systems, and processes in biology and medicine, computer processing, analysis, and synthesis of the obtained results.
- FC 12 Ability to ensure and monitor compliance with safety and biomedical ethics when working with medical equipment

**The program learning outcomes** after studying the discipline "Pre-diploma Practice" are (OP put into effect by the Rector's Order NOD/434/24 dated 10.06.2024):

- PLO 01 The ability to apply knowledge of the fundamentals of mathematics, physics and biophysics, bioengineering, chemistry, engineering graphics, mechanics, materials resistance and strength, properties of gases and liquids, electronics, computer science, signal and image acquisition and analysis, automatic control, system analysis, and decision-making methods at a level necessary for
- PLO 02 Formulate logical conclusions and reasoned recommendations regarding the assessment, operation, and implementation of biotechnical, medical-technical, and bioengineering tools and methods.
- PLO 03 Manage complex actions or projects, take responsibility for making engineering decisions in unforeseen conditions, conduct technical- economic and safety assessments of projects
- PLO 04 Apply the provisions of regulatory and technical documents governing the procedure for product certification, production certification
- PLO 05 Be able to use databases, mathematical and software tools for data processing and computer modeling of biotechnical systems
- PLO 06 Be able to communicate with professionals in the healthcare field in both the state and foreign languages (English or one of the other official EU languages) and understand their requirements for biomedical products and services, taking into account the philosophical, historical context, and the concept of a healthy lifestyle
- PLO 07 Provide engineering support, service, and technical maintenance during the operation of laboratory analytical equipment, medical diagnostic and therapeutic complexes and systems in accordance with the rules established by technical documentation and regulatory documents governing the procedures for commissioning, application, and repair of medical equipment, as well as to form the standard documentation by types of work according to the technical regulation on medical devices
- PLO 08 Understand theoretical and practical approaches to the creation and management of medical equipment and medical technology
- PLO 09 Understand theoretical and practical approaches to the creation and application of artificial biological and biotechnical objects and materials for medical purposes

- PLO 10 Be able to plan, organize, direct, and control medical-technical and bioengineering systems and processes*
- PLO 11 Conduct quality control and operational monitoring of medical equipment and materials for medical purposes, artificial organs, and prostheses*
- PLO 12 Provide recommendations for selecting equipment to facilitate diagnosis and treatment*
- PLO 13 Be able to analyze signals transmitted from organs to devices and process diagnostic information (signals and images).*
- PLO 14 Analyze the level of compliance with current global standards, evaluate decisions, and formulate tasks for the development of automated control systems considering the capabilities of modern technical and software automation tools for medical equipment*
- PLO 15 Select and recommend appropriate medical equipment and biomaterials for equipping medical institutions and ensuring the main stages of the technological process of diagnosis, prevention, and treatment*
- PLO 16 Ability to utilize computer-aided design and drafting systems for developing the technological and hardware schematics of medical devices and systems, taking into account the specifics of their components*
- PLO 17 Application of knowledge in chemistry and bioengineering to create, synthesize, and apply artificial biotechnical and biological objects*
- PLO 18 Understanding of fundamental-applied, medical-physical, and physico-chemical principles governing the functioning of biological objects, as well as bioengineering fundamentals of technologies and equipment for researching human body processes*
- PLO 19 Proficiency in engineering methods for calculating components of medical devices and systems, modern methods for experimental verification of integrity and functionality of biotechnical systems and determination of their characteristics, methods for selecting conventional and advanced construction materials, as well as tools for designing devices, instruments, and systems for medical and biological purposes*
- PLO 20 Knowledge and application of research methods in biomedical engineering, methods and tools for organizing and processing experimental data, statistical methods for modeling and simulating processes and systems of physical and biological nature, modern programming technologies and supporting tools, methods for designing digital and microprocessor-based medical systems*
- PLO 21 Understanding and use of scientific and technical principles, methods, and research tools for the development, planning, and design of experimental and new researches in the field of biomedical engineering using medical, biological, biomedical devices and biotechnical systems, medical biomaterials, as well as for quantitative assessment of the functioning of physiological systems*
- PLO 22 Knowledge of general principles and structure of complex biological systems, including the human body and its functions from the perspective of a systemic approach and their utilization in biomedical engineering, as well as basic methods and tools used for quantitative assessment of physiological system functioning*
- PLO 23 Development and implementation of modern diagnostic and therapeutic methods associated with the use of biotechnology, computer, and nanotechnology through the improvement of technical elements of medical devices and systems, as well as medical products, in the process of professional activity*
- PLO 24 Being able to consider historical, social, environmental, ethical, legal, economic aspects, requirements of labor protection, industrial hygiene, and fire safety when forming technical solutions, taking into account the strengthening and preservation of personal and public health*

## **2. Prerequisites and Postrequisites of the Course (place within the structural and logical framework of the educational programme)**

*The discipline is interdisciplinary in nature. It is the foundation for preparing the certification work for the successful completion of studies in the specialty.*

*Required skills: Successful implementation of an individual learning plan.*

### **3. Course Content**

*The main sections and topics that will be covered during the course:*

*According to the individual calendar plan for preparing the certification work and the work program.*

### **4. Learning Materials and Resources**

#### **Basic literature**

1. *On approval of the Technical Regulations for Medical Devices [Electronic resource]: Resolution of the Cabinet of Ministers of Ukraine dated 02.10.2013 No. 753 // Bulletin of the Verkhovna Rada of Ukraine. – Access mode: <https://zakon.rada.gov.ua/laws/show/753-2013-%D0%BF>.*
2. *On approval of the Technical Regulations on medical devices for diagnostics in vitro [Electronic resource]: Resolution of the Cabinet of Ministers of Ukraine dated 02.10.2013 No. 754 // Bulletin of the Verkhovna Rada of Ukraine. – Access mode: <https://zakon.rada.gov.ua/laws/show/754-2013-%D0%BF>.*
3. *On approval of the Technical Regulations on active implantable medical devices [Electronic resource]: Resolution of the Cabinet of Ministers of Ukraine dated 02.10.2013 No. 755 // Bulletin of the Verkhovna Rada of Ukraine. – Access mode: <https://zakon.rada.gov.ua/laws/show/755-2013-%D0%BF>.*
4. *On technical regulations and conformity assessment [Electronic resource]: Law of Ukraine dated 15.01.2015 No. 124-VIII // Bulletin of the Verkhovna Rada of Ukraine. – 2015. – No. 14. – Art. 96. – Access mode: <https://zakon.rada.gov.ua/laws/show/124-19>.*
5. *On approval of the list of national standards, compliance with which provides a presumption of conformity of medical products with the requirements of the Technical Regulations for Medical Products [Electronic resource]: Order of the Ministry of Health of Ukraine dated 11.10.2017 No. 1245 // Official website of the Ministry of Health of Ukraine. – Access mode: <https://moz.gov.ua/article/ministry-mandates/nakaz-moz-ukraini-vid-11102017--1245-pro-zatverdzhennja-pereliku-nacionalnih-standartiv-vidpovidnist-jakim-nadae-prezumpciju-vidpovidnosti-medichnih-virobiv-vimogam-tehnichnogo-reglamentu-schodo-medichnih-virobiv>.*
6. *On approval of the higher education standard in specialty 163 Biomedical Engineering for the third ( educational and scientific) level of higher education: Order of the Ministry of Education and Science of Ukraine dated 12/30/2021 No. 1499 [Electronic resource]. – Access mode: <https://mon.gov.ua/npa/pro-zatverdzhennya-standartu-vishoyi-osviti-zi-specialnosti-163-biomedichna-inzheneriya-dlya-tretogo-osvitno-naukovogo-rivnya-vishoyi-osviti>.*
7. *Standard of Higher Education of Ukraine of the first (bachelor's) level of higher education in the specialty 163 "Biomedical Engineering" of the field of knowledge 16 "Chemical and Bioengineering" [Electronic resource] / Ministry of Education and Science of Ukraine. – Kyiv, 2018 (updated 2021). – Access mode: <https://mon.gov.ua/static-objects/mon/sites/1/vishcha-osvita/zatverdzeni%20standarty/12/21/163-biomiedinzbakalavr-1012.pdf>.*
8. *Standard of higher education of Ukraine of the first (bachelor's) level of higher education in the specialty 163 "Biomedical Engineering" of the field of knowledge 16 "Chemical and Bioengineering" [Electronic resource]: approved by the Order of the Ministry of Education and Science of Ukraine dated 19.11.2018 No. 1371 // Official website of the Ministry of Education and Science of Ukraine. – Access mode: <https://mon.gov.ua/static-objects/mon/sites/1/vishcha-osvita/zatverdzeni%20standarty/12/21/163-biomiedinzbakalavr-1012.pdf>.*

9. REGULATIONS ON THE ORGANIZATION OF THE EDUCATIONAL PROCESS AT IHORY SIKORSKI KPI / Ministry of Education and Science of Ukraine, NTUU "KPI". Kyiv, 2020. – 17p. // [https://document.kpi.ua/files/2020\\_7-124.pdf](https://document.kpi.ua/files/2020_7-124.pdf)
10. REGULATIONS ON THE PROCEDURE FOR CONDUCTING INTERNSHIP FOR HIGHER EDUCATION STUDENTS OF IHORY SIKORSKY KPI / Ministry of Education and Science of Ukraine, NTUU "KPI". Kyiv, 2020. – 16 p. [https://document.kpi.ua/files/2020\\_7-172.pdf](https://document.kpi.ua/files/2020_7-172.pdf)

#### **Supporting literature**

1. Regulations for conducting semester control in remote mode . More details: <https://osvita.kpi.ua/node/148>
2. On approval of the Requirements for the design of a dissertation: Order of the Ministry of Education and Science of Ukraine dated January 12 , 2017 No. 40 (as amended by Order of the Ministry of Education and Science of Ukraine dated May 31, 2019 No. 759). More details: <https://zakon.rada.gov.ua/laws/show/z0155-17#Text>

#### **Information resources**

1. Google Class "Undergraduate Internship" (course code 7rxjtrqt )
2. Information service of Igor Sikorsky Kyiv Polytechnic Institute <https://document.kpi.ua/> and [osvita.kpi.ua](https://osvita.kpi.ua)
3. [Faculty of Biomedical Engineering https://fbmi.kpi.ua](https://fbmi.kpi.ua)

The list of information resources includes their sources.

### **Educational content**

#### **5. Methodology for Studying the Course (Educational Component)**

No.	Topic	Program me Learning Outcome s	Main tasks	
			Control West	Term implementatio n
1.	<b><u>Before the start of the internship:</u></b>		Individual consultations	
	Agree with the department (head of practice from the department) the place of practice (practice base);		Individual consultations	No later than two months before the start of the internship
	To coordinate with the thesis supervisor (hereinafter referred to as the thesis supervisor) the tasks on the relevant topic.		Individual consultations	No later than two weeks before the start of the internship
2.	Arrival of the applicant for internship, registration and receipt of passes.		Individual consultations	1-2 days
3.	Conducting safety and health training, etc.			1 week <sup>1</sup>

<sup>1</sup> according to the educational process schedule for the current academic year

No.	Topic	Program me Learning Outcome s	Main tasks	
			Control West	Term implementatio n
4.	<p>Conducting individual organizational events:</p> <ul style="list-style-type: none"> <li>– familiarization with the scope of practice, knowledge, skills and abilities of the applicant during the practice period;</li> <li>– with the content and technology of the internship;</li> <li>– with the features of searching, collecting and selecting the necessary scientific and practical sources and literature;</li> <li>– requirements for a report on the applicant's completion of the internship program and individual assignment.</li> </ul>			
5.	Familiarization with practice facilities			
6.	<p>Familiarization with the features of internships in:</p> <ul style="list-style-type: none"> <li>- scientific and research institutions, etc.;</li> <li>- diagnostic and in scientific and medical institutions, etc.;</li> <li>- public and private institutions and organizations</li> </ul>			
7.	Conducting tours of the institution/organization, familiarizing yourself with the workplace			
8.	Development of a report plan, introduction to the topic of DR for practice		Individual consultations	1-2 days 1 week
9.	Familiarization with the list of literature based on practice: regulatory materials, descriptions, visual aids, etc.		Individual consultations	1-2 weeks
10.	Implementation of the internship program and individual assignment with weekly reporting on the implementation of the calendar plan through weekly reports certified by the head of the DR.	PLO 1-24	Individual consultations	Throughout the practice
11.	As intended, complete additional sections (if necessary)		Individual consultations	Throughout the practice

No.	Topic	Program me Learning Outcome s	Main tasks	
			Control West	Term implementatio n
12.	<i>Diary design for 1 week</i>		<i>Individual consultations</i>	<i>1 week</i>
13.	<i>Diary design in 2 weeks</i>		<i>Individual consultations</i>	<i>2 week</i>
14.	<i>Diary design for 3 weeks</i>		<i>Individual consultations</i>	<i>3 week</i>
15.	<i>Diary design for 4 weeks</i>		<i>Individual consultations</i>	<i>4 week</i>
16.	<i>Preparation of the internship report. Submission:</i>  <ul style="list-style-type: none"> <li>– <i>for verification of NPP from the additional section (if necessary);</i></li> <li>– <i>to the head of the Department of Education to check the substantive text of the report and its compliance with the design requirements approved by the department.</i></li> </ul>		<i>Individual consultations</i>	<i>4 week</i>
17.	<i>Receiving feedback on the internship from the head of the internship base. Fill out a diary at the internship base (signatures, seals, etc.)</i>		<i>Individual consultations</i>	
18.	<i>Agree with the head of the department on a plan for defending the practice. Prepare a presentation on defending the practice and coordinate it with the head.</i>		<i>Test</i>	
19.	<i>Providing a package of practice documents to those responsible for practice at the department in paper and electronic form (a completed practice diary, practice report, etc.). Additionally, the following are provided in electronic form: a publication plan on the topic of DR or implementation (if available) and a presentation for the practice defense.</i>			
20.	<i>Defense of the internship by the applicant at a commission appointed by the head of the department (subject or cycle commission)</i>			<i>Week 5<sup>2</sup></i>

*Responsibility for organizing, conducting and monitoring students' practice lies with the head of the BMI graduation department. Direct supervision of each student's practice is entrusted to the teacher (head*

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<sup>2</sup> Within 10 calendar days from the date of completion of the internship

of the DR) and the practice manager from the department, who are appointed and approved at the department meeting by the head of the department. Assignment of DR managers to the student and the approximate topic of the practice assignment is approved at the department meeting in September of the current year. By March 1 of the current year, the DR manager must approve the individual assignment and the calendar plan for the implementation of the individual practice assignment of the student(s) assigned to him/her from the head of the department.

The department's practice manager, with the help of the department heads, monitors weekly the implementation of individual calendar plans by students and reports to the head of the department.

In the event that a student fails to comply with the approved calendar plan in a timely manner (without a valid reason), a decision may be made at a meeting of the department to not admission of a student to the defense of the internship and his subsequent expulsion from the university.

#### **Distance learning platform:**

For more effective communication in order to understand the structure of the academic discipline "Pre- diploma Practice" and master the material, e-mail, telegram channel, and the distance learning platform "Sikorsky" based on the Moodle system are used. KPI-Telecom / GOOGLE WORKSPACE FOR EDUCATION and the Zoom online meeting service, with which you can:

- ✓ the efficiency of communication with students increases, convenient feedback is provided;
- ✓ the placement, access and exchange of educational material is simplified;
- ✓ students' learning tasks are assessed;
- ✓ student activity is analyzed.

## **6. Independent Student Work**

The following types of independent work are planned: on the topic of the certification work, preparation and execution of the report and accompanying documents, preparation for the test. A total of 360 hours are planned for independent work.

One of the main types of semester control during the mastering of the academic discipline "Pre-diploma Practice" is the execution of a report. The report is executed in accordance with the requirements, within the deadline specified by the teacher.

It aims to master the skills of identifying current problems; additional, in-depth study and practical awareness of individual sections of the curriculum; and development of skills for independent work with scientific literature.

The main goal of the report is to solve a practical problem using theoretical material and practical skills learned during studies in the Bachelor of Biomedical Engineering program.

A student can write a report only on a topic agreed upon with the teacher.

#### **Approximate topic of work:**

1. According to the topic of the certification work.

Detailed requirements for the execution and preparation of the report and accompanying documentation are given in the methodological recommendations for the discipline.

The title page of the report should have the following content: name of the university; name of the faculty; name of the department; code and name of the specialty; code and name of the educational and professional program; name of the academic discipline; topic of the report; course, academic group number; surname and name of the student; surname and name of the DR supervisor; surname and name of the NPP responsible for the additional section (if necessary); surname and name of the DR consultant (if necessary); student's certification that the report does not contain borrowings from the works of other authors without appropriate references; year.

The title page is followed by the plan (table of contents) of the report, which should include the following sections: introduction; sections of the main content of the practice and general conclusions for each of them; general conclusions; list of sources used; appendix. The table of contents indicates the page numbers of the beginning of each section on the right. Each section begins on a new page.

The total volume of the report (from the title page to the list of sources used, excluding appendices) can vary from 18 to 20 pages, depending on the chosen topic. The volume of the report is determined by the student's ability to briefly and at the same time comprehensively reveal the topic: the relevance of the topic under consideration, current trends and problems, analyze the best foreign and Ukrainian technologies, draw conclusions and substantiate their own proposals and recommendations.

The report is accompanied by an abstract in two languages – Ukrainian and English, indicating keywords.

**Mandatory requirement:** clear reference to sources of information. All figures, facts, opinions of scientists, quotes, formulas must have references in the form of [2] (the number means the number of the source in the list of references given at the end of the creative work). It is advisable to use tables, diagrams, graphs, charts, etc. The list of sources used (at least 20 sources) is drawn up in accordance with current rules with the obligatory provision of the URL code. If the information is taken from the Internet, it is necessary, as for ordinary literature, to indicate the author, the title of the article, and then provide the URL code or the address of the site on the Internet.

The report is evaluated according to the following criteria: logical plan; completeness and depth of disclosure of the topic; reliability of the data obtained; reflection of practical materials and calculation results; availability of illustrations (tables, figures, diagrams, etc.); clarity of references to sources; design; substantiation of the student's own opinion in the form of conclusions at the end of each main section and general conclusions from the report.

The report is not checked for similarity of text (plagiarism) using public resources, but it must meet the requirements of academic integrity. If academic dishonesty is detected, the work is canceled and not checked.

#### Diary

The diary is the main document of a higher education student during his internship and must have the following sections:

- ✓ order for internship;
- ✓ a memo with provisions for completing the internship and keeping a diary;
- ✓ calendar of internship with individual tasks;
- ✓ comments from managers during the internship period, feedback from the manager from the company about the internship by the higher education applicant;
- ✓ conclusion of the head of the department on the practice of the higher education applicant with a credit assessment of the practice

## Policy and control

### 7. Course Policy (Educational Component)

#### **Class attendance**

Attendance at lectures and practical classes is not provided. However, students are recommended to attend individual consultations. The assessment system is focused on obtaining points for student activity, as well as completing tasks that can develop practical skills and abilities.

Missed consultations are not processed.

#### **Missed assessment activities**

Omissions of control measures are not implemented.

If academic dishonesty is detected, the work is canceled and not reviewed.

#### **Deadlines and incentive point**

Incentive points	
Criterion	Weighted score
completing tasks to improve didactic materials for the discipline	1 point

participation in scientific and scientific-innovative activities (with the provision of relevant documents)	up to 10 points
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### **Academic integrity**

The policy and principles of academic integrity are defined in Section 3 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More details: <https://kpi.ua/code>.

### **Norms of ethical behavior**

The norms of ethical behavior of students and employees are defined in Section 2 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More information: <https://kpi.ua/code>.

### **Procedure for appealing assessment results**

Students have the opportunity to raise any issue related to the examination procedure and expect it to be addressed according to predetermined procedures.

The student has the right to appeal the results of the control measure in accordance with the approved regulations on appeals at Igor Sikorsky Kyiv Polytechnic Institute (approved by order No. HOH/128/2021 dated 05/20/2021) - <https://osvita.kpi.ua/index.php/node/182>

### **Inclusive learning**

The academic discipline "Pre-diploma Practice" can be taught to most students with special educational needs, except for students with severe visual impairments that do not allow them to complete tasks using personal computers, laptops and/or other technical means.

### **Distance learning**

Distance learning takes place through the Sikorsky Distance Learning Platform.

Distance learning through taking additional online courses on a specific topic is not allowed.

The list of courses is offered by the teacher after students express their desire (since the bank of available courses is updated almost every month).

Control measures can be carried out during independent work of students in remote mode (with the possibility of consulting with the teacher via email, social networks).

### **Learning in a foreign language**

Teaching in English is provided only for foreign students.

At the request of students, it is allowed to study the material using English-language online courses on topics that correspond to the topics of specific classes.

## **8. Types of Assessment and Rating System for Learning Outcomes (RSLO)**

The evaluation of the results of the internship is carried out on a 100-point scale with mandatory conversion of grades to the university scale (with grades of "excellent", "very good", "good", "satisfactory", "sufficient" or "unsatisfactory").

In accordance with the rating system for assessing student learning outcomes, the 100-point scale of grades for practice is divided into two stages:

Stage I – the applicant's points for the written part of the report, which is 40 points;

Stage II – defense of the practice, which is worth 60 points.

Calculation of student scores Stage I

Points will be distributed according to the following criteria:

No. s/n	Type of work	Number of points
1	<i>Evaluation of internship completion and calendar plan implementation by applicants: Weekly reports (for 7 weeks) The weighted score of the report is 1 point. Total 1 point x 7 reports = 7 points</i>	7
2	<i>Assessment of the timeliness and completeness of the preparation of supporting documents</i>	3
3	<i>Evaluating a written report 30-28 points "Excellent", (at least 95% of the required information) 27-25 points "Very good", (at least 85% of the required information) 24-22 points "Good", (at least 75% of the required information) 21-19 points "Satisfactory", (at least 65% of the required information) 18 points "Satisfactory", (at least 60% of the required information) 0 points "Unsatisfactory", (does not meet the requirements of "Satisfactory")</i>	30
<i>Total points for stage I</i>		40

### *Calculation of points for the defense of the practice (stage II)*

*Points for defending the practice are awarded according to the following criteria:*

<i>Rating</i>	<i>Evaluation criterion</i>	<i>Points</i>
<i>"Perfectly"</i>	<i>The applicant clearly and fully disclosed the goal of the practice, the ways to achieve it, and thoroughly substantiated the decisions made. The answers to the questions demonstrate the applicant's ability to professionally defend his or her own point of view, as well as the fact that he or she possesses professional knowledge at a modern level. The illustrative material (presentation) fully, with high clarity, reveals the main provisions of the work being defended. The material was created using modern graphic packages in compliance with the requirements of regulatory documents.</i>	<i>60-56 points</i>
<i>"Very good"</i>	<i>The applicant clearly and fully disclosed the goal of the practice, the ways to achieve it, deeply argues the decisions made, but makes minor errors and assumptions. The candidate can professionally defend his/her own point of view. The answers to the questions are essentially correct, but not always sufficiently complete and well-reasoned. The illustrative material (presentation) fully, but with insufficient clarity, reveals the main provisions of the work. The material was created using modern graphic packages, there are minor deviations from the requirements of regulatory documents.</i>	<i>55-51 points</i>
<i>"Good"</i>	<i>The applicant clearly and fully disclosed the goal of the practice, the ways to achieve it, deeply argues the decisions made, but makes mistakes and assumptions. The candidate can professionally defend his/her own point of view. The answers to the questions are essentially correct, but not sufficiently complete and well-reasoned. The illustrative material (presentation) fully, but with insufficient clarity, reveals the main provisions of the work. The material was created using modern graphic packages, there are deviations from the requirements of regulatory documents.</i>	<i>50-46 points</i>
<i>"Satisfactorily"</i>	<i>The report on the practice is essentially correct, but structured illogically and unclearly. The answers to the questions are incomplete, and inaccuracies are suggested in the reasoning behind the decisions made.</i>	<i>45-41 points</i>

Rating	Evaluation criterion	Points
	<i>The illustrative material (presentation) does not fully and clearly reveal the main points of the work. The material was created using modern graphic packages, there are significant deviations from the requirements of regulatory documents.</i>	
"Enough"	<i>The report on the practice is essentially correct, but it is constructed illogically, unclearly, and has many omissions. The answers to the questions are incomplete, and significant inaccuracies are assumed in the reasoning behind the decisions made. The illustrative material (presentation) does not fully and clearly reveal the main points of the work. The material was not created using modern graphic packages, and there are significant deviations from the requirements of regulatory documents.</i>	40-36 points
"Not satisfactory"	<i>Does not meet the "Satisfactory" criterion</i>	0 points

*Assessment is carried out in accordance with the Regulations on the system of assessment of learning outcomes at Igor Sikorsky Kyiv Polytechnic Institute (Approved and put into effect by order No. 1/273 of September 14, 2020,) [https://osvita.kpi.ua/sites/default/files/downloads/Pologennia\\_RSO\\_2022.pdf](https://osvita.kpi.ua/sites/default/files/downloads/Pologennia_RSO_2022.pdf)*

*The results are announced to each student individually in the presence of the control event or remotely (by e-mail, in the "Sikorsky" system). They are also recorded in the "Electronic Campus " system.*

*Violation of task deadlines and incentive points*

*Incentive points: participation in scientific and scientific-innovative activities (with the provision of relevant documents) or completion of tasks to improve didactic materials in the discipline up to 10 points.*

*Penalty points: violation of the deadlines for control measures without good reason (for each control measure); untimely completion and submission of the report (2 points for each day) up to 10 points.*

*Conditions for admission to semester control (credit): Availability of supporting documents and a positive grade for the report of at least 18 points.*

*Optional admission requirements: none*

*The final scores for the practice defense are summed up and listed in accordance with the table of correspondence of rating scores according to the university scale.*

*Table of conversion of rating points to grades on the university scale:*

Number of points	Rating for university scale
100-95	Perfectly
94-85	Very good
84-75	Good
74-65	Satisfactorily
64-60	Enough
Less than 60	Unsatisfactorily
Admission conditions not met	Not allowed

*The test is conducted in accordance with the REGULATIONS ON THE PROCEDURE FOR CONDUCTING INTRA-COURSE FOR HIGHER EDUCATION STUDENTS AT IGOR SIKORSKY KPI and the Regulations on the system for assessing learning outcomes at Igor Sikorsky KPI.*

## **9. Additional Course Information (Educational Component)**

*Detailed requirements for the execution and preparation of the report and accompanying documentation are given in the methodological recommendations for the discipline.*

***The working program of the academic discipline ( syllabus ):***

***Compiled by*** Hanna Romanivna Ovcharenko, senior lecturer of the Department of Biomedical Engineering

***Approved*** by the Department of Biomedical Engineering (Minutes No. 16 dated 06/21/2024)

***Approved*** by the Methodological Commission of the Faculty of Biomedical Engineering (minutes No. 9 dated 06/26/2024)