The National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

Ecology and technology of plant polymers

PRACTICE OF MASTERS OF EDUCATIONAL AND PROFESSIONAL TRAINING

Work program of the educational component (Syllabus)

EDUCATIONAL COMPONENT REQUISITES

Level of higher education	***Second (Master's)***
Discipline	10 Natural Sciences
Specialty	101 Ecology
Educational program	Environmental safety
Status of the educational component	Regulatory
Form of study	full-time (day)
Year of training, semester	2nd year of study, 3rd semester
The scope of the educational component	12 credits
Terminal control/control measures	test
Class schedule	8 weeks, according to the University Order
Language of instruction	Ukrainian
Information about the course leader/teachers	Practice leaders appointed according to the University Order
Course placement	Link to a remote resource (Moodle , Google classroom , etc.)

EDUCATIONAL COMPONENT PROGRAM

1 DESCRIPTION OF THE EDUCATIONAL COMPONENT, PURPOSE, SUBJECT OF STUDY AND RESULTS TEACHING

Internship is one of the important practical disciplines in the training of specialists in higher education, it is one of the final stages of the master's degree in the educational and professional direction of training in higher education institutions (HEIs) of Ukraine.

The purpose of practical training is to enable higher education students to master modern methods, forms of organization and tools of labor in the field of their future professional activity, to form professional skills based on the knowledge obtained and to gain experience in making independent decisions during specific work in real market and production conditions, and to foster the need to systematically update their knowledge and creatively apply it in practical activities [1].

The subject of the practice is to deepen the skills of independent practical work, expand the scientific worldview of students, finalize the topic of the master's thesis, determine its

structure and content of the main sections.

According to the requirements of the educational and professional program, after mastering the credit module "Practice" students must demonstrate the following ***competencies:***

- Ability to learn and master modern knowledge
- Ability to make informed decisions
- Ability to generate new ideas (creativity)
- Ability to search, process and analyze information from various sources
- Ability to motivate people and move towards a common goal
- Ability to develop and improve methods and technologies
- Awareness at the level of the latest achievements necessary for research and/or innovative activities in the field of ecology, environmental protection and sustainable development

nature management

- Ability to use principles, methods and organizational procedures research and/or innovation activities
- Ability to apply new approaches to analyzing and forecasting complex phenomena, critical understanding of problems in professional activities
- Ability to prove knowledge and own conclusions to specialists and non-specialists
- Ability to organize work related to the assessment of the ecological state, environmental protection and optimization of natural resources, in conditions of incomplete
  information and conflicting demands
- Ability for self-education and advanced training based on innovative approaches in the field of ecology, environmental protection and sustainable development
  nature management
- Ability to assess the level of negative impact of natural and anthropogenic environmental hazards to the environment and humans
- Ability to develop a complex of management solutions
- The ability to collect and process information in order to obtain parameters, that characterize the state of the environment

According to the requirements of the educational and professional program, after mastering the credit module "Practice" students must demonstrate the following ***program results:***

- Know and understand fundamental and applied aspects of environmental sciences
- Be able to use conceptual ecological patterns in professional practice Activities
- To know at the level of the latest achievements the basic concepts of natural science, sustainable
  development and methodology of scientific knowledge
- Know the legal and ethical standards for evaluating professional activities, developing and
  implementation of socially significant environmental projects in conditions of conflicting
  requirements
- Demonstrate the ability to organize collective activities and implement comprehensive environmental protection projects, taking into account available resources and
  time limits
- Know the latest methods and tools of environmental research, including including methods and tools of mathematical and geoinformation modeling
- Be able to communicate in a foreign language in scientific, industrial and socio-social spheres of activity
- Be able to convey professional knowledge, own knowledge, clearly and

unambiguously
justification and conclusions for specialists and the general public
- Know the principles of personnel and resource management, basic approaches to decision-making in conditions of incomplete/insufficient information and conflicting requirements
- Demonstrate awareness of the latest protection principles and methods environment
- Be able to use modern information resources on environmental issues, nature management and environmental protection
- Be able to assess landscape and biological diversity and analyze the consequences anthropogenic impact on natural environments
- Be able to assess the potential impact of man-made objects and economic environmental activities
- Apply new approaches to developing a decision-making strategy in difficult unpredictable conditions
- Assess environmental risks in the face of insufficient information and conflicting requirements
- Choose the optimal management and/or environmental management strategy in depending on environmental conditions
- Critically reflect on theories, principles, methods and concepts from different subject areas
industries for solving practical tasks and environmental problems
- Be able to use modern methods of processing and interpreting information when conducting innovative activities
- Be able to independently plan the implementation of an innovative task and to formulate conclusions based on its results
- Know modern approaches to organizing environmentally friendly production,
- reorganization and reconstruction of existing production facilities from the perspective of resource conservation
taking into account the product life cycle
- Analyze the results of environmental monitoring of enterprises, assess the engineering and technical level of environmental protection equipment environment from the harmful effects of production
- Using scientific and technical information, regulatory documents, professional knowledge, apply methods of managing technological processes, equipment that ensure the protection of water bodies, atmosphere, soil and subsoil from pollution and harmful effects

2 PREREQUISITES AND POSTREQUISITES OF THE EDUCATIONAL COMPONENT (PLACE IN THE STRUCTURAL AND LOGICAL SCHEME OF TRAINING FOR THE CORRESPONDING EDUCATION) PROGRAM)

The educational component "Practice" is planned for the fall semester for the 2nd year for masters in the educational and professional program in the specialty 101 Ecology and
provide a single comprehensive approach to organizing practical training, systematicity, continuity and continuity of student learning.

Prerequisites are the main disciplines that students studied during the first year of their master's degree.

Post-requisites The educational component "Practice" is:

1. The first full version of the master's thesis (MD).
2. Approbation of the obtained results in the form of abstracts for participation in scientific and practical conferences or publication in a professional journal

edition.

3. Protecting a report with practices.

3 CONTENT OF THE EDUCATIONAL COMPONENT

Market requirements for the qualification level of master's graduates of technical higher education institutions of Ukraine require the presence of theoretical, applied, technological and other types of competencies necessary for the production of goods and services in conditions of modern high-tech production, fierce competition, limited production resources, risks and uncertainty of market conditions.

The features of educational , scientific and educational and professional master's degree programs in polytechnic universities of Ukraine and leading technical universities in the world, in most cases, combine both scientific and research, technological, and undergraduate components for the preparation of master's theses and the acquisition of professional competencies.

The presence of a research component in a master's thesis is mandatory not only for masters of educational and scientific, but also for educational and professional training programs.

Definition 1. Scientific novelty is a properly formalized category of new data, information, or knowledge obtained about a subject of research that changes, supplements, or improves existing data, information, or knowledge about that subject of research.

Scientific novelty can relate to both theoretical and applied results of scientific research.

Along with scientific novelty, an equally important characteristic of a scientific result is the practical value of the results of scientific research.

Definition 2. Practical value is a measure of assessing the scientific, technical, economic, socio-political, and other necessary characteristics of usefulness, efficiency, productivity, necessity, etc., application of research results.

Thus, when forming a work program and individual practice tasks, it is necessary to include scientific, scientific and technical, design, technological and other research components necessary to obtain a scientific result that will have both scientific novelty and practical value. value

The current trend of students acquiring knowledge and skills from all sources and resources available to them is likely to continue to develop, improve, and become systemic in the competitive market for providing educational services. services.

To achieve the goal of the discipline "Practice", students need to complete a certain number of tasks. All practice tasks are combined into four classes according to the criteria of content and the order of their completion. The completion of each class of tasks ends with a current/calendar control, and the completion of the final fourth class of tasks - with a semester control (credit).

Task class 1. Clarify and/or formulate:

1) a statement of the established form addressed to the head of the department with the preliminary title of the MD topic and a request to appoint a scientific manager;
2) formalization of the MD problem statement: object, subject and goal of the study, the final result of the implementation MD;
3) the matrix of entities of the unified model of the system "Practice" of the master's thesis (MSSP MD);
4) MD template – the first version of the MD according to the format and requirements of the Regulations on the state certification of masters of Igor Sikorsky Kyiv Polytechnic Institute [2] with a prescribed structure and tasks on MD and accomplished first section MD with previous by name
"Review of existing solutions on the topic of MD", and other sections.

Current control/calendar control No. 1 of the practice - based on the results of the implementation and content of documents for task class 1.

Task class 2. Approve, protect and prepare:

1) approve the final topic, formalize the problem statement and objectives MD;
2) to form and protect the first version of the MD template with all the completed sections;
3) prepare a draft of a scientific conference paper (or an article for publication in a professional journal) Ukraine).

Current control/calendar control No. 2 of the practice - based on the results of completing tasks and the content of documents for task class 2.

Task class 3. Document the results of the internship:

1) submit to the organizing committee of the conference/editor's office of a scientific professional publication an abstract of a report/article, for example, for the conference "Applied Mathematics and Computing ", with all accompanying documents documents;
2) to formalize scientific novelty, practical value and conclusions based on the results of scientific research on the topic MD;
3) prepare a presentation of the results of the practice for the exam practices;
4) to give a presentation at a scientific and practical meeting determined by the master's student and the scientific supervisor conferences.

Current control/calendar control No. 3 of the practice - based on the results of completing tasks and the content of documents for task class 3.

Task class 4. Prepare and submit to the commission and defend a report on the practice:

1) submit to the commission for accepting the results of the internship a final statement with the topic of the MD, a diary from the internship, a report from the internship, a presentation of the report from practices;
2) protect the results practices;
3) get acquainted with the procedure for preliminary protection MD.

Semester control (assessment) of the internship - based on the results of the internship report, completion of tasks and the content of documents for task class 4.

The individual task is developed by the student together with the head of the MD and the head of the base enterprise, then agreed with the practice supervisor. The content of the individual task is consistent with the topic of the master's thesis.

Together with the individual assignment, the student forms a calendar plan for completing the internship. The implementation of the individual assignment is monitored by the internship supervisor from the department, the MD's scientific supervisor, and a representative of the internship base according to the calendar plan.

Calendar of the internship:

No.	Content	Term implementation	Execution note
1.	Submit a standard application addressed to the head of the department with the preliminary title of the MD topic and a request appoint a scientific supervisor.		

2.	Formalize the MD problem statement: object, subject and purpose of the study, final result execution of MD.		
3.	Form a matrix of entities of a unified system model "Practice" of the master's thesis (MSSP MD).		
4.	Prepare a MD template – first version MD.		
5.	Approve the final topic, formalize the problem statement , and MD task.		
6.	Generate and protect the first version of the MD template by all sections.		
7.	Prepare a draft abstract for a paper at a scientific conference (or an article for publication in a professional publication) Ukraine).		
8.	Submit the abstract of the report/article to the organizing committee of the conference/editor's office of a scientific professional publication, for example, for a conference		
9.	To formalize the scientific novelty, practical value and conclusions based on the results of scientific research in the topic of MD;		
10.	Prepare a presentation of the results practices for practice credit.		
11.	To give a presentation at a designated Master's student and scientific supervisor of the scientific and practical conference		
12.	Submit to the commission for accepting the results of the internship a final statement with the topic of the MD, an internship diary, an internship report, presentation of the internship report.		
13.	Protect the results of the practice.		
14.	Get to know the order preliminary defense of MD.		

4 EDUCATIONAL MATERIALS AND RESOURCE

1. Regulations on the organization of the educational process at Igor Sikorsky Kyiv Polytechnic Institute : approved by order of the Rector, ORDER No. 7-124 dated 07/20/2020.

[electronic resource] . - Access mode - https://document.kpi.ua/regulations . - Screen title.- Language Ukrainian .
2. The Regulations on the Procedure for Conducting Practice for Applicants of Higher Education of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" were approved by the order of the Rector, ORDER No. 7/172 dated September 24, 2020. [electronic resource] . - Access mode - https://document.kpi.ua/files/2020_7-172.pdf. - Screen title.- Language Ukrainian
3. Methodological recommendations on the organization of student practice and drawing up work programs for practice at the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute” [Text] / Compiled by: N. M. Lapenko , I. L. Spivak, I. V. Fedorenko, O. M. Shapovalova ; General editor: P. M. Yablonsky . – Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2018. – 29 with.

EDUCATIONAL CONTENT

5 METHODOLOGY OF MASTERING EDUCATIONAL COMPONENT

ORGANIZATION, CONDUCT AND MANAGEMENT OF PRACTICE

Internship can take place at an enterprise, organization or educational institution. The internship is supervised by the university by the department lecturer responsible for the internship, the supervisor of the final qualification work, and by a supervisor from among the specialists in the specialty profile on the enterprise side.

The head of the practice from the department ensures the implementation of all organizational measures before the start of the practice: briefing on the procedure for completing the practice; providing students-interns with the necessary documents: referral to practice, practice diary.

The supervisor of the final qualification work provides advice on issues related to writing the master's thesis.

The internship begins with mandatory briefing for all students on safety techniques at the enterprise and workplaces, and familiarization with the rules of internal regulations.
Regulations on the practice of higher education applicants of Igor Sikorsky Kyiv Polytechnic Institute (Order No. 7-172 dated September 24, 2020 regulates the duties of the practice manager and student.

The practice supervisor from the department must [1-3]:

- develop work programs for practice and coordinate them with practice databases no later than two weeks before the start practices;
- warn students about the need to obtain a medical certificate of health (if necessary) 7 days before the start practices;
- no later than 7 days before the start of the internship, provide the internship bases with lists of student interns for registration of temporary passes;
- prepare and provide a student or group of students with a referral to practice;
- When sending two or more students for internship, appoint a senior group leader who is the assistant to the leader. practices;
- hold meetings with students and familiarize them with the work programs practices;
- give students diaries with individual assignments and a calendar of activities practices;
- ensure timely arrival of students to the practice bases and monitor the completion of the practice;
- systematically, at least once a week, advise students and control the stages of completing an individual task according to the calendar plan;
- assist the internship supervisor from the company in compiling the characteristics of each student;
- participate in the acceptance of credits from practices;

- verify the return of passes, literature, and property by all students to the enterprise;
- to draw up a log of work, as well as to conduct safety briefings if students are undergoing internships in structural units divisions
university;
- submit a report to the dean's office on the results of the internship with suggestions for its improvement.

University students during internship are obliged [1-3]:

- Before the start of the internship, receive a referral for the internship, a work program for the internship, and a diary from the internship supervisor from the department practices;
- arrive at the base on time practices;
- fully perform all tasks stipulated in the internship work program and its instructions managers;
- know and strictly adhere to the rules of labor protection, safety and industrial sanitation, and internal regulations enterprises;
- to be responsible for the work performed work;
- to timely prepare a report and make a balance sheet with practices.

Practice diary

The main document used to monitor the completion of the internship is the internship diary, which is issued by the department. The diary contains an individual task, a calendar plan for the internship, and weekly notes. The internship supervisors from the department and the internship base check the diary every week and write down their comments. The master's thesis supervisor monitors the implementation of the individual task. After the internship period ends, the supervisor from the internship base provides feedback on the student's completion of the internship in the diary and evaluates its results with a grade, the master's thesis supervisor writes a review of the state of the master's thesis in diary.

6 INDEPENDENT WORK STUDENT

During the internship, the student must complete the following amount of work:

1. Definition of the object and subject of research taking into account the base practices (enterprises/institutions).
2. Together with the scientific supervisor of the MD, the content of the individual task.
3. Determining the terms and scope of the necessary theoretical research and calculations.
4. Collection and systematization of information about the object research.
5. Object model description research.
6. Evaluating relationships between elements models.
7. Clarification of the topic of the MD. Formulation of the problem statement for writing a master's thesis.
8. Analysis and selection of methods and technologies for the implementation of the task tasks.
9. Generating a report from practices.

Ensuring program outcomes through educational components

Know and understand fundamental and applied aspects of environmental sciences	Formalize the MD problem statement: object, subject and purpose of the study, final result execution of MD. Prepare a draft abstract for a paper at a scientific conference (or an article for publication in a professional publication)

	Ukraine). To formalize the scientific novelty, practical value and conclusions based on the results of scientific research in the topic of MD;
Be able to use conceptual ecological patterns in professional practice activities	Prepare a presentation of the results practices for practice credit. To give a presentation at a designated Master's student and scientific supervisor of the scientific and practical conference
To know at the level of the latest achievements the basic concepts of natural science, sustainable development and methodology of scientific knowledge	To formalize scientific novelty, practical value and conclusions based on the results of scientific research in MD topic;
Know the legal and ethical standards for evaluating professional activities, developing and implementation of socially significant environmental projects in conditions of conflicting requirements	Form a matrix of entities of a unified system model "Practice" of the master's thesis (MSSP MD).
Demonstrate the ability to organize collective activities and implement comprehensive environmental protection projects, taking into account available resources and time limits	Prepare a draft abstract for a paper at a scientific conference (or an article for publication in a professional publication) Ukraine). To give a presentation at a designated Master's student and scientific supervisor of the scientific and practical conference
Know the latest methods and tools of environmental research, including including methods and tools of mathematical and geoinformation modeling	Form a matrix of entities of a unified system model "Practice" of the master's thesis (MSSP MD).
Be able to communicate in a foreign language in scientific, industrial and socio- social spheres of activity	To give a presentation at a designated Master's student and scientific supervisor of the scientific and practical conference
Be able to convey professional knowledge, own knowledge, clearly and unambiguously justification and conclusions for specialists and the general public	To give a presentation at a designated Master's student and scientific supervisor of the scientific and practical conference
Know the principles of personnel and resource management, basic approaches to decision-making in conditions of incomplete/insufficient information and conflicting requirements	Submit to the commission for accepting the results of the internship a final statement with the topic of the MD, an internship diary, an internship report, presentation of the internship report.
Demonstrate awareness of the latest	To give a presentation at a designated

protection principles and methods environment	Master's student and scientific supervisor of the scientific and practical conference
Be able to use modern information resources on environmental issues, nature management and environmental protection	Submit the abstract of the report/article to the organizing committee of the conference/editor's office of a scientific professional publication, for example, for a conference
Be able to assess landscape and biological diversity and analyze the consequences anthropogenic impact on natural environments	To formalize the scientific novelty, practical value and conclusions based on the results of scientific research in MD topic;
Be able to assess the potential impact of man-made objects and economic environmental activities	To formalize the scientific novelty, practical value and conclusions based on the results of scientific research in the topic of MD;
Apply new approaches to developing a decision-making strategy in difficult unpredictable conditions	Form a matrix of entities of a unified system model "Practice" of the master's thesis
Assess environmental risks in the face of insufficient information and conflicting requirements	To formalize scientific novelty, practical value and conclusions based on the results of scientific research in the topic of MD;
Choose the optimal management and/or environmental management strategy in depending on environmental conditions	Form a matrix of entities of a unified system model "Practice" of the master's thesis
Critically reflect on theories, principles, methods and concepts from different subject areas industries for solving practical tasks and environmental problems	Submit the abstract of the report/article to the organizing committee of the conference/editor's office of a scientific professional publication, for example, for a conference
Be able to use modern methods of processing and interpreting information when conducting innovative activities	Submit the abstract of the report/article to the organizing committee of the conference/editor's office of a scientific professional publication, for example, for a conference
Be able to independently plan the implementation of an innovative task and to formulate conclusions based on its results	Submit the abstract of the report/article to the organizing committee of the conference/editor's office of a scientific professional publication, for example, for a conference
Know modern approaches to organizing environmentally friendly production, reorganization and reconstruction of existing production facilities from the perspective of resource conservation taking into account the product life	Prepare a draft abstract for a paper at a scientific conference (or an article for publication in a professional publication) Ukraine).

cycle	
Analyze the results of environmental monitoring of enterprises, assess the engineering and technical level of environmental protection measures environment from the harmful effects of production	Prepare a draft abstract for a paper at a scientific conference (or an article for publication in a professional publication) Ukraine).
Using scientific and technical information, regulatory documents, professional knowledge, apply methods of managing technological processes, equipment that ensure the protection of water bodies, atmosphere, soil and subsoil from pollution and harmful effects	Prepare a draft abstract for a paper at a scientific conference (or an article for publication in a professional publication) Ukraine).

POLICY AND CONTROL

7 EDUCATIONAL COMPONENT POLICY

Requirements for the internship report

Upon completion of the internship, students must submit a written report, along with a diary, to the internship supervisor from the department within the established deadline (no later than three days after the internship).
end of internship) for verification, review and admission to defense. The written review of the internship supervisor from the department and the MD scientific supervisor are entered into the student's diary.

The internship report should contain information on the student's implementation of the internship program and individual assignment. The systematization of the collected materials is carried out by the student during the internship and is completed within the time specially allocated for this purpose, in accordance with the internship program.

Structure and content of the practice report sections

The internship report consists of the following sections or documents:

1. Title page of the report (sample).
2. Contents of the internship report.
3. Introduction, with a brief overview of the problem area in which the MD is being performed, a brief argumentation of the relevance of the declared research, and a brief summary of the report sections.
4. Formalization of the MD problem statement (object, subject and purpose of the study, the final result of the implementation) MD).
5. The first full version of the MD with all sections and appendices completed. The MD consists of the following elements:
   - Title page of the established sample;
   - Tasks for the master's thesis "established sample;
   - Abstract (in Ukrainian);
   - Abstract (abstract in English) language);
   - Content;
   - List of symbols, abbreviations and terms;
   - Introduction;

- The main part with a list of sections;
- Conclusions;
- List of used literature;
- Appendix A to the MD - Demonstration version of the software (architecture, brief description of functionality, programming language, software performance results, etc).
- Appendix B to the MD - Presentation of the first full version of the MD with all sections completed (individual slides have not yet been developed).
- Appendix B to the MD - Draft article (abstract) of a report at a selected conference or other publication on the topic of the MD published (submitted and/or accepted for publication) in a professional publication.

6. Conclusions to the report.

Summing up the practice

The report is defended by the student at a commission [3] appointed by the head of the department. The commission includes the practice supervisors from the department, and the supervisors of master's theses. The commission accepts the credit within the first ten days after the end of the practice.

To be admitted to the internship credit, the student must submit the commission (no later than three days before the end of the internship) for verification and review:

1) internship report;
2) presentation of the report with practices;
3) diary practices.

8 TYPES OF CONTROL AND RATING SYSTEM FOR ASSESSING LEARNING RESULTS (RSO)

Current control: checking the practice diary every week
Calendar control: checking the performance of four classes of tasks according to the calendar plan.
Semester control: defense of the practice report, test.
Conditions for admission to semester control: minimum positive grade for completing the individual assignment, minimum rating 60 points.

Evaluation criteria:

1) Availability of documents: internship report; internship report presentations; internship diary - 60 points.
2) Defense of the internship report and completion of an individual assignment practices

Evaluation criteria:

1) full completion of an individual task – 40 points;
2) incomplete completion of an individual task –10- 20 points;
3) sufficient correspondence to the content of the individual task –0 - 5 points.

Table of correspondence of rating points to grades on the university scale:

Number of points	*Rating*
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

Work program of the educational component (syllabus):
Compiled by Assoc . Prof., Ph.D., Ovsyankina V.O.

Approved by the Department of EtaTRP (protocol No. 17 dated 05/29/2025)
Approved by the IHF Methodological Commission (protocol No. 11 dated 27.06.2025)