Національний технічний університет України
«КИЇВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ
імені ІГОРЯ СІКОРСЬКОГО»

Ecology and technology of plant polymers

SCIENTIFIC-RESEARCH PRACTICE OF MASTERS OF EDUCATIONAL AND SCIENTIFIC FIELD OF TRAINING

Working program of the academic discipline (Syllabus)

Details of the academic discipline	
Level of higher education	***Second (master's)***
Branch of knowledge	*16 Chemical and bioengineering*
Specialty	***161 Chemical technologies and engineering***
Educational program	*Chemical resource-efficient technologies of inorganic and organic substances, materials and coatings*
Discipline status	*Normative*
Form of education	*full-time (full-time), part-time (full-time)*
Year of training, semester	*2nd year of study, 4th semester*
Scope of the discipline	*9.0 credits (270 hours)*
Semester control/ control measures	*Test*
Lessons schedule	*5 weeks, according to the University Order*
Language of teaching	*Ukrainian*
Information about the course leader / teachers	Heads of practice, appointed according to the University Order
Placement of the course	*https://do.ipo.kpi.ua/course/view.php?id=4395*

Program of educational discipline

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

The subject of the academic discipline. Research practice is one of the important practical disciplines of training specialists in higher education, namely: masters in the educational and scientific direction of training in higher education institutions (HEIs) of Ukraine.

The purpose of the educational discipline.

The purpose of practical training is the student's acquisition of professional skills and the ability to carry out independent research [1]. The essence of the practice is to involve graduate students in independent research work, familiarization with the methodology of conducting research work in academic and specialized institutes, leading companies.

The subject of research practice is deepening the skills of independent scientific work, expanding the scientific worldview of students, researching the chosen problem and the ability to connect it with the theoretical direction of research, to determine the structure, logic and content of the future master's work.

1.1 According to the requirements of the educational and professional program, after mastering the credit module "research practice", students should develop the following competencies:

- the ability to use and adapt theoretical knowledge and practical skills obtained in the course of study to solve scientific and applied research;

- demonstrate knowledge and understanding of basic concepts, principles of implementation of real scientific and applied developments for enterprises, institutions and organizations;

- the ability to research, classify and analyze indicators of the quality of chemical products, technological processes and equipment of chemical production;

- the ability to use the results of scientific research and R&D to improve existing and/or develop new technologies and equipment for chemical industries.

1.2. According to the requirements of the program of the academic discipline, students after mastering itmust demonstrate the following program learning outcomes:

- to develop and implement projects in the field of chemical technologies and related interdisciplinary projects taking into account social, economic, environmental and legal aspects;

- search for the necessary information in scientific and technical literature, patents, databases, and other sources on chemical technology, processes and equipment for the production of chemical substances and materials based on them, systematize, and analyze and evaluate the relevant information.

2. Pre-requisites and post-requisites of the discipline (place in the structural and logical scheme of training according to the relevant educational program)

The discipline "Research practice" is planned in the fourth semester of the 2nd year for masters of the National Academy of Sciences in the specialty 161 "Chemical technologies and engineering". The discipline "Research practice" is based on the principles of integration of various knowledge acquired by students during the bachelor's and the 1st semester of master's studies during the study of engineering disciplines. Discipline "Research practice"is the basis that should providesolution of technical problems and aimed at deep rethinking of existing and creation of new holistic knowledge and professional practice.

3. Content of the academic discipline

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

Features of educational-scientific and educational-professional master's training programs at polytechnic higher education institutions of Ukraine and leading technical universities of the world, in most cases, combine both scientific-research, technological, and pre-diploma components for preparing master's theses and acquiring professional competencies.

The modern trend of students acquiring knowledge and acquiring skills from all sources and resources available to them will most likely continue to develop, improve and acquire a systemic nature in the competitive market of providing educational services. In accordance with the Law of Ukraine on Higher Education, the master's educational and scientific program must necessarily include a research, scientific component of at least 30 percent of the entire content of the master's thesis. Scientific novelty can refer to both theoretical and applied results of scientific research.

Definition 1.*Scientific novelty is a properly formalized category of new data, information or knowledge obtained about the subject of research that changes, supplements or improves existing data, information or knowledge about this subject of research. Scientific novelty can refer 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 scientific-technical, economic, socio-political, and other necessary characteristics of usefulness, efficiency, productivity, necessity, etc., of the application of research results. Thus, in the process of forming the work program and individual practice tasks, it is necessary to include scientific, scientific-technical, design, technological and other research components necessary to obtain a scientific result that will have both scientific novelty and practical value.*

The modern trend of students acquiring knowledge and acquiring skills from all sources and resources available to them will most likely continue to develop, improve and acquire a systemic nature in the competitive market of providing educational services.

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

Task class 1*. Clarify and/or form:*

1) a statement of the prescribed format in the name of the head of the department with the preliminary title of the MD topic and a request to appoint a scientific supervisor;

2) formalization of MD task statement: object, subject and purpose of research, final result of MD performance;

3) matrix of entities of the unified model of the system "Research practice" of the master's thesis (MSSP MD);

4) MD template – the first version of MD according to the format and requirements of the Regulation on the state certification of masters of KPI named after Igor Sikorskyi [2] with the prescribed structure, tasks for the MD and completed first section of the MD with the previous title "Overview of existing solutions on the topic of MD", and other sections. Current control/calendar control No. 1 of practice - according to the results of the execution and content of documents for the class of tasks 1.

Task class 2.*Approve, protect and prepare:*

1) to approve the final topic, formalization of the statement of the problem and MD tasks;

2) create and protect the first version of the MD template with all sections completed;

3) prepare a draft abstract of a report at a scientific conference (or an article to be published in a professional publication of Ukraine). Current control/calendar control No. 2 of practice - based on the results of tasks and the content of documents for task class 2.

Task class 3*. To issue the results of practice:*

1) submit abstracts of the report/article with all accompanying documents to the conference organizing committee/editor of the scientific publication;

2) formalize scientific novelty, practical value and conclusions based on the results of scientific research on the topic of MD;

3) prepare a presentation of practice results for practice credit;

4) deliver a report at a scientific-practical conference determined by the master's student and the supervisor. Current control/calendar control No. 3 of practice - based on the results of tasks and the content of documents for task class 3.

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

1) submit a final statement on the subject of MD, a practice diary, a practice report, a presentation of a practice report to the commission for accepting practice results;

2) protect practice results;

3) familiarize yourself with the procedure for preliminary protection of MD. Semester control (credit) of practice - based on the results of the practice report, the performance of tasks and the content of documents for class 4 tasks.

The individual task is developed by the student in cooperation with the head of the MD and the head of the base enterprise, then it is agreed with the head of practice. The content of the individual task is consistent with the topic of the master's thesis. Together with the individual task, the student forms a calendar plan for the internship. The performance of the individual task is monitored by the head of practice from the department, the scientific head of the MD and the representative of the practice base according to the calendar plan.

Practice schedule:

The total duration of practice is 8 weeks.

Approximate distribution of practice duration:

No	*Content*	*Deadline*	*Performance Note*
1	*Submit an application of the established sample at the name of the head of the department with the previous one with the name of the MD topic and a request to appoint a scientific supervisor.*		
2	*Complete the formalization of the formulation of the MD task: the object, subject and purpose of the research, the final result of the MD implementation.*		
3	*To form a matrix of entities of the unified model of the system "Research practice" of the master's thesis (MSSP MD).*		
4	*Prepare the MD template - the first version of the MD.*		
5	*Approve the final topic, formalization of the problem statement and MD tasks.*		
6	*Create and protect the first version of the MD template with all sections completed.*		
7	*Prepare a draft abstract of a report at a scientific conference (or an article for Publication in a professional publication of Ukraine).*		
8	*Submit to the organizing committee conference/editing of a scientific professional edition of a report/article thesis, for example, for the "Resource-energy-saving technologies and*		

	equipment" conference, with all accompanying documents.		
9	*To formalize scientific novelty, practical value and conclusions regarding the results of scientific research on the topic of MD;*		
10	*Prepare a presentation of the results of the practice for credit from the practice.*		
11	*Give a speech at a scientific-practical conference determined by the master's student and the academic supervisor.*		
12	*Submit a final application on the subject of MD, a practice diary, a practice report, and a presentation of the practice report to the commission for accepting practice results.*		
13	*Protect the results of practice.*		
14	*Familiarize yourself with the order of preliminary protection of MD.*		

4. Educational materials and resources

1. Regulations on the organization of the educational process at Igor Sikorskyi KPI: approved by the order of the Rector, ORDER No. 7-124 dated 07/20/2020. [Electronic resource] . - Access mode - https://document.kpi.ua/regulations. - Title from the screen. - Ukrainian language.

2. The regulations on the procedure for the practice of higher education applicants of the National Technical University of Ukraine "Ihor Sikorskyi Kyiv Polytechnic Institute" were approved by the order of the Rector, ORDER No. 7/172 dated 09/24/2020. [Electronic resource] . – Access mode - https://document.kpi.ua/files/2020_7-172.pdf. - Title from the screen. - Ukrainian language.

3. Methodological recommendations on issues of organization of students' practice and preparation of practical work programs of the National Technical University of Ukraine "Ihor Sikorskyi Kyiv Polytechnic Institute" [Text] / Composer: N.M. Lapenko, I.L. Spivak, I.V. Fedorenko, O.M. Shapovalova; in general ed. P.M. Yablonsky. - K.: KPI named after Igor Sikorskyi, 2018. – 29 p.

4. Primakov S.P., Barbash V.A. Technology of paper and cardboard. - K.: ECMO, 2002. - 396 p.

Educational content

5. Methods of mastering an educational discipline (educational component)

ORGANIZATION, CONDUCT AND MANAGEMENT OF PRACTICE

Research practice can take place at an enterprise, organization or educational institution. On the part of the university, practice management is carried out by the teacher of the department, who is responsible for the practice, the head of the graduation qualification work, on the part of the company - by a manager from among specialists according to the specialty profile.

The head of practice from the department ensures the implementation of all organizational measures before the start of practice: briefing on the procedure for passing practice; provision of necessary documents to intern students: referral to practice, practice diary.

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

The scientific research practice begins with the mandatory for all students instruction on safety techniques at the enterprise and workplaces, familiarization with the rules of the internal procedure.

Regulations on the practice of higher education applicants of KPI named after Igor Sikorskyi (Order

No. 7-172 dated September 24, 2020 regulates the duties of the head of practice and the student.

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

- develop work programs of practice and coordinate them with practice databases no later than two weeks before the start of practice;

- warn students about issuing a medical certificate about their health (if necessary) 7 days before the start of practice;

- no later than 7 days before the start of the internship, provide the internship bases with lists of student-interns for issuing temporary passes;

- prepare to provide a student or a group of students with a referral for practice;

- when two or more students are sent for practice, appoint the senior group, who is the assistant to the practice manager;

- hold meetings with students and acquaint them with work practice programs;

- issue diaries to students with individual tasks and a calendar plan for practice;

- ensure the timely arrival of students at practice bases and monitor the completion of practice;

- systematically, at least once a week, advise students and monitor the stages of individual task performance according to the calendar plan;

- to help the head of practice from the enterprise in compiling the characteristics of each student;

- to take part in accepted credits from practice;

- check the return of passes, literature and property to the enterprise by all students;

- issue a log of going to work, as well as conduct an instruction on safety techniques, if students are doing internships in the structural divisions of the university;

- submit to the dean's office a report on the results of practice with suggestions for its improvement.

Students of the university during internship are obliged [1-3]:

- before the beginning of practice, receive from the head of practice at the department referrals for practice, work program of practice and practice diary;

- arrive at the practice base on time;

- to fully perform all the tasks provided for by the internship work program and the instructions of its supervisors;

- to know and strictly follow the rules of occupational health and safety, safety and industrial sanitation, and internal regulations of the enterprise;

- to be responsible for the work done;

- to issue a report in a timely manner and make a credit from practice.

Practice diary

The main document, according to which the internship is monitored, is the internship diary issued by the department. The diary contains an individual task, a practice calendar, and weekly entries.

Practice managers from the department and the practice base check the diary every week and write down their comments. The supervisor of the master's thesis supervises the implementation of the individual task. After the end of the practice period, the supervisor from the practice base provides feedback on the student's practice in the diary and evaluates its results with a grade, the supervisor of the master's thesis writes a feedback on the state of the master's thesis in the diary.

6. Independent work of the 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 practice base (enterprise/institution).

2. Forming the content of the individual task together with the scientific director of the MD.

3. Determination of the terms and scope of the necessary theoretical studies and calculations.

4. Collection and systematization of information about the object of research.

5. Description of the research object model.

6. Evaluation of relationships between model elements.

7. Clarification of the topic of MD. Formulation of the statement of the problem for writing a master's thesis

theses.

8. Analysis and selection of methods and technologies for the implementation of the given task.

9. Forming a practice report.

Policy and control

7. Policy of academic discipline (educational component)

Practice report requirements

At the end of the internship, students must submit a written report together with a diary to the supervisor of the internship from the department within the set deadline (no later than three days after the end of the internship) for inspection, review and admission to the defense. The written review of the head of practice from the department and the scientific supervisor of MD are entered in the student's diary.

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

The structure and content of the practice report sections

The practice report consists of the following sections or documents:

1. Title page of the report (according to the sample).

2. Contents of the practice report.

3. Introduction, with a brief overview of the problem area for which MD is performed, a brief argumentation of the relevance of the declared research, a brief summary of the sections of the report.

4. Formalization of the statement of the task of MD (object, subject and purpose of research, final result of MD).

5. The first full version of MD with all sections and appendices completed. MD consists of the following elements:

- Title page of the established sample;

- Tasks for the master's thesis" of the established model;

- Abstract (in Ukrainian);

- Abstract (abstract in English);

- Content;

- List of conventional designations, abbreviations and terms;

- Introduction;

- The main part with a list of sections;

- Conclusions;

- References;

- Appendix A 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 MD - Draft article (thesis) of a report at a selected conference or other publication on the topic of MD published (submitted and/or accepted for publication) in a professional publication.

6. Conclusions to the report.

Summary of practice

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

In order to be admitted to the practice credit, the student must present the commissions (no later than three days before the end of the practice) for verification and review:

1) practice report;

2) presentation of the practice report;

3) practice diary.

8 Types of control and rating system for evaluating learning outcomes (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, credit.*

Terms of admission to semester control*: a minimum positive assessment for the performance of an individual task, a minimum rating of 60 points.*

Evaluation criteria:

1) Availability of documents: practice report; presentations of practice reports; practice diary - 60 points.

2) Protection of the practice report and performance of the individual practice task

Evaluation criteria:

1) complete completion of an individual task - 40 points;

2) incomplete completion of an individual task – 10-20 points;

3) sufficient correspondence of the content of the individual task –0 - 5 points.

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

R	*University scale*
95...100 points	*Perfectly*
85...94 points	*Very good*
75...84 points	*Fine*
65...74 points	*Satisfactorily*
60...64 points	*Enough*
R<60 points	*Unsatisfactorily*
Admission conditions not met	*Not allowed*

Working program of the academic discipline (syllabus):

Compiled*associate professor, Ph.D., Ploskonos V.G.*

Approved*department ___E and TRP___ (protocol No. 17 dated 23.05.2024)*

Agreed*by the IHF Methodical Commission (protocol No. 11 dated 06/28/2024)*