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

Ecology and technology of plant polymers

Execution of a master's thesis

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	*Industrial ecology and resource-efficient clean technologies*
Discipline status	*Normative*
Form of education	*face-to-face (day)/face-to-face (evening)/distance/mixed*
Year of training, semester	*2nd year, autumn semester*
Scope of the discipline	*12 (360)*
Semester control/ control measures	*Protection*
Lessons schedule	*Independent work of student*
Language of teaching	*Ukrainian*
Information about head of the course / teachers	Head: https://eco-paper.kpi.ua/pro-kafedru/vykladachi
Placement of the course	

Program of educational discipline

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

A master's thesis is a type of qualifying work of a graduate of the "master's" educational and qualification level, intended for objective control of the degree of formation of scientific and research competencies, is an independent study of current problems in the field of chemical technologies and engineering.

The master's thesis is a final qualification work of scientific content, which has internal unity and reflects the results of the development of the chosen topic. It should correspond to the current level of development of chemical technologies and engineering, and its topic should be relevant.

The master's thesis is presented in a form that allows you to judge how fully reflected and substantiated the provisions contained in it, conclusions and recommendations, their novelty and significance are. The totality of the results obtained in such work indicates that the master has the skills of scientific work in the chosen field of professional activity.

The work on the master's thesis allows to reveal the skills of its author: to plan experimental studies, conduct them and process experimental data, analyze the obtained results; work with technical and reference literature; to express one's thoughts in a technically competent language, know the key problems in the field of the chosen master's program and modern scientific means of their analysis and solution; formulate and solve tasks that arise in the course of scientific research and require in-depth professional knowledge, choose the necessary research methods and information technologies, present the results of the work performed in the form of reports, abstracts, articles; to independently carry out research work.

The subject of the academic discipline "Performing a master's thesis"*is the development of new approaches (methods, algorithms, models, etc.) to solve a certain range of tasks or one problem that*

cannot be solved by known methods. The master's thesis should have some practical significance. The main conclusions of the work should serve as the basis of specific recommendations and measures to improve those processes and phenomena that are the subject of research in the dissertation.

The purpose of the master's thesis*is the determination of the student's level of preparedness for solving a complex of scientific problems and applied tasks based on the application of the system of theoretical knowledge and practical skills acquired during the entire period of study. In accordance with the goal, the training of masters in this specialty requires strengthening of the developed competencies:*

- *Ability to generate new ideas (creativity);*
- *Ability to apply knowledge in practical situations;*
- *Ability to search, process and analyze information from various sources;*
- *The ability to research, classify and analyze quality indicators of chemical products, technological processes and equipment of chemical production;*
- *The ability to organize and manage chemical and technological processes in the conditions of industrial production and in research laboratories, taking into account social, economic and environmental aspects;*
- *The ability to use the results of scientific research and research and development for the improvement of existing and/or development of new technologies and equipment of chemical industries;*
- *The ability to use modern special scientific equipment and software when conducting experimental research and conducting research and development in the field of chemical technologies and engineering;*
- *Ability to independently develop technological projects through creative application of existing and generation of new ideas;*
- *Ability to demonstrate knowledge and own conclusions to specialists and non-specialists;*
- *Ability to develop and manage projects;*
- *The ability to apply new approaches to the analysis and forecasting of complex phenomena, critical understanding of problems in professional activity;*
- *Ability to communicate in a foreign language in professional activities;*
- *The ability to manage the strategic development of the team in the process of professional activity;*
- *The ability to organize works related to the assessment of the ecological state, environmental protection and optimization of nature use.*

According to the requirementsmaster's training programs, in the process of preparing and defending a master's thesisstudentsmust demonstrate the following program learning outcomes:

- *Critically interpret scientific concepts and modern theories of chemical processes and chemical engineering, apply them in conducting scientific research and creating innovations;*
- *Search for the necessary information on chemical technology, processes and equipment for the production of chemical substances and materials based on them, systematize, analyze and evaluate the relevant information;*
- *Organize your work and the work of the team in the conditions of industrial production, project units, research laboratories, determine goals and effective ways to achieve them, motivate and train personnel;*
- *To assess the technical and economic characteristics of the results of scientific research, research and development, technologies and equipment of chemical production;*
- *Communicate freely in national and foreign languages orally and in writing to discuss and present the results of professional activities, research and projects;*
- *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;

- Be able to independently make and substantiate strategic decisions in the field of chemical technologies and engineering;

- Be able to clearly and unambiguously convey professional knowledge, own justifications and conclusions to specialists and the general public, present own and collective technological, including innovative, projects;

- Demonstrate awareness of the latest principles and methods of environmental protection;

- Be able to use modern information technologies;

- To know modern approaches to the organization of ecologically clean productions, reorganization and reconstruction of existing productions from the standpoint of resource conservation.

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

Implementationmaster's thesis is based on the principles of integration of various knowledge acquired by students during their studies at the master's degree and in the process of studying the disciplines of general and professional training and engineering and technical direction.

3. Content of the academic discipline

The content of the master's thesis characterizes the originality and uniqueness of the given information. The basis of the content of the dissertation is fundamentally new material, which includes the description of new factors, phenomena and regularities or the generalization of previously known provisions from other scientific positions. The content of the dissertation in the most systematized form records both the initial premises of the scientific research and the obtained results. This graduation thesis of scientific content has an internal unity and reflects the progress and results of the development of the chosen topic. The master's thesis, on the one hand, has a generalizing character, as it is a kind of summary of the master's training, and on the other hand, it is an independent original scientific research of the student.

The content of the master's thesis includes:

– formulation of a scientific (scientific and technical) task, definition of the object, subject and purpose of the research, analysis of the status of the solution to the task based on the materials of domestic and foreign publications, justification of the research goals;

– analysis of possible research methods and methodologies, justified choice (development) of research method(s) or hardware;

– scientific analysis and generalization of actual material used in the research process;

- presentation of the obtained results and assessment of their theoretical, applied or scientific-methodological significance;

- checking the possibilities of practical implementation of the obtained results;

- approval of the obtained results and conclusions in the form of publications in scientific journals and collections, patents (applications) for inventions, utility models, industrial samples, etc., reports at scientific conferences.

The master's thesis has the following structure:

- *title page;*
- *task;*
- *abstract;*
- *content;*
- *a list of conventional designations, symbols, abbreviations and terms;*
- *sections and subsections of the main part;*
- *conclusions;*
- *references;*
- *applications (if necessary).*

The content of each part of the master's thesis is determined by its topic.

4. Educational materials and resources

Basic literature

1. *Order of the Ministry of Education, Culture, Sports and Science of Ukraine dated January 12, 2017 No. 40 "On Approval of Requirements for Dissertation".*
2. *National standard of Ukraine. Information and documentation. Bibliographic reference. General provisions and rules of drafting. DSTU 8302:2015. - K.: SE "UkrNDNC", 2016. - 16 p.*
3. *National standard of Ukraine. Information and documentation. Reports in the field of science and technology. Structure and design rules. DSTU 3008:2015. - K.: SE "UkrNDNC", 2016. - 31 p.*
4. *National standard of Ukraine. Information and documentation. Bibliographic description. Abbreviations of words and phrases in the Ukrainian language. General requirements and rules. DSTU 3582:2013. - K.: Ministry of Economic Development of Ukraine, 2014. - 18 p.*

Additional literature

5. *Regulations on the examination board and attestation of applicants for higher education at KPI named after Igor Sikorsky. Approved and put into effect by Order No. 7/178 of October 1, 2020, K: KPI named after Igor Sikorskyi, 2022. – 23 p.*

Information resources on the Internet

6. *Scientific and technical library named after G.I. Denisenko / [Electronic resource]. - Access mode:https://library.kpi.ua*
7. *National Library named after V.I. Vernadsky / [Electronic resource]. - Access mode:http://www.nbuv.gov.ua/*
8. *Electronic archive of scientific and educational materials of KPI named after Igor Sikorsky / [Electronic resource]. - Access mode:https://ela.kpi.ua/*

Educational content

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

Classroom classes are not included in the plan.

6. Independent work of a student/graduate student

A master's thesis is an independent research work that performs a qualifying function, that is, it is prepared for the purpose of public defense and obtaining an academic master's degree. The main task of the student is to demonstrate the level of his scientific qualifications, the ability to independently conduct scientific research and solve specific scientific tasks.

In the process of preparation and defense of the dissertation, the student must demonstrate the ability to conduct a systematic analysis of the problem and solve it based on known approaches, propose new ways to solve the problem (problem); the ability to reasonably choose research methods, modify existing ones and develop new methods, based on the tasks of a specific study; the ability to apply modern methods of experimental research, methods of planning an experiment and processing its results; the ability to scientifically analyze the results obtained and develop conclusions and provisions, the ability to defend them with arguments ; the ability to assess the possibilities of using the obtained results in scientific and practical activities; mastery of modern information technologies during research and preparation of qualification work.

No.	The name of the topic submitted for independent processing	Number of

z/p		hours of SRS
1	Formulation of the problem, justification of the relevance of the chosen topic • the choice of methods and justification of the topic of scientific research; • patent search and literature review; • justification of the purpose and resolution of research tasks on the topic of the master's thesis.	30
2	Generalization and systematization of new progressive solutions by research topic. Selection and justification of methods for solving research problems. Selection of modern technologies by research topic.	5
3	Definition of the object and subject of research.	5
4	Formulation of the purpose and specific tasks of the research.	5
5	Identification and determination of the scientific novelty of the research. Justification of elements of novelty and usefulness of the results of the master's thesis.	5
6	Conducting and describing theoretical and experimental research.	250
7	Analysis of research results, comparison with previously known data.	10
8	Formulation of conclusions and evaluation of the obtained results.	5
9	Completion of master's qualification work.	40
10	Checking the master's thesis for plagiarism.	5
	Hours in general	360

According to the results of the master's thesis, at least two works must be published.

Policy and control

7. Policy of academic discipline (educational component)

Policy of deadlines and rescheduling

In the event of any force majeure circumstances during the execution of the master's thesis and the impossibility of submitting it for defense, the student must contact the teacher through the available (provided by the teacher) communication channels to resolve problematic issues and agree on the algorithm of actions.

Policy of academic integrity

Plagiarism and other forms of dishonest work are unacceptable. Plagiarism refers to the absence of references when using printed and electronic materials, quotes, opinions of other authors. It is not permissible to copy materials protected by the copyright system without the permission of the author of the work.

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

Policy of academic behavior and ethics

Students should be tolerant, respect the opinions of others, formulate objections in the correct form, constructively support feedback during classes.

Standards of ethical behavior of students and employees are defined in Chapter 2 of the Code of Honor of the National Technical University of Ukraine "Ihor Sikorskyi Kyiv Polytechnic Institute". More details:https://kpi.ua/code

8. Types of control and rating system for evaluating learning outcomes (RSO)

The master's thesis is the final qualification work. Dissertation defense is a form of control.

System of rating (weighted) points and evaluation criteria

No. z/p	Characteristics	Weight factor	Rating	Result

1	Justification of the purpose of the research, depth of analysis of the state of the solution to the problem	0.1		
2	Justification of the choice of the research method	0.05		
3	Depth of theoretical justification of research and modeling of objects	0.15		
4	The level of performance of laboratory experiments	0.3		
5	Scientific novelty of the work	0.2		
6	The quality of the design of the dissertation	0.1		
7	Publication of research results	0.1		
			Total points:	

The system of rating points and evaluation criteria:
The weighted score of each thesis evaluation criterion is 100 points.

Completeness and signs of task completion	**Points**
The task is fully completed	100
Minor flaws	80-99
Incomplete answer, significant errors	40-79
Poor performance of the task	10-39
Failure to meet the criterion	0

To obtain the final grade, the sum of the received points is translated according to the table:

Scores	**Rating**
95...100	perfectly
85...94	very good
75...84	fine
65...74	satisfactorily
60...64	enough
RD<60	unsatisfactorily
Admission conditions not met	not allowed

Working program of the academic discipline (syllabus):

Compiled by:*Assoc., Ploskonos V.G.*

Approved by the Department of E and TRP (*protocol No.17 dated 05/23/2024****)***

Agreed by the methodological commission of the IHF (protocol No. 11 dated 06/28/2024)