MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

NATIONAL TECHNICAL UNIVERSITY
«KHARKIV POLYTECHNICAL INSTITUTE»

METHODOLOGICAL GUIDANCE

for master’s diploma paper

for foreign students

specialty 101 "Ecology"

Kharkiv
NTU «KhPI»

2024

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ
«ХАРКІВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ»

МЕТОДИЧНІ ВКАЗІВКИ

до виконання дипломного проєкту другого (магістерського) рівня
для іноземних студентів
спеціальності 101 «Екологія»

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CONTENTS

INTRODUCTION

The basis for methodological guidelines design for the diploma paper implementation in the field of "Ecology" at the Department of Chemical Engineering and Environmental Protection of the National Technical University "Kharkiv Polytechnic Institute" (NTU "KhPI") is STZVO-KhPI-2.01-2021 "Diploma projects and theses. General requirements for implementation" [1]. This standard establishes general requirements for the procedure for preparation, execution and defense of diploma projects and diploma theses (paper) for all levels of education.

1 GENERAL PROVISIONS

The second (master's) level of higher education provides for a person to acquire in-depth theoretical and/or practical knowledge, abilities, skills in the chosen specialty (specialization), general principles of methodology for scientific and/or professional activity, other competencies sufficient for the effective task performance of an innovative nature for relevant level of professional activity.

The purpose of diploma design as the final stage of student education at the university is to systematize, consolidate and expand the acquired knowledge. Students must demonstrate fluency in the information and skills acquired during the implementation of the curriculum in the specialty "Ecology" and, ultimately, the correspondence of their professional level to the master's degree in ecology. It is established by the examination committee (EC) on the basis of diploma paper (diploma project) (DP) defense.

When starting work on the DP, the diploma student must systematize the materials collected during the pre-diploma practice and clarify with the diploma consultant the project (paper) content, scope and its implementation schedule.

Each student has his/her diploma consultant (DC) who is chosen among appointed professors, associate professors, the most experienced senior teachers of Department of Chemical Engineering and Environmental Protection or among research staff of higher education institution, as well as highly qualified specialists from enterprises (organizations), candidates and doctors of science.

DC is chosen by students themselves according to the list of potential diploma consultants that should be given for students before starting the DP doing. DC are approved by rector’s order.

DP is carried out on the basis of the task. This task must be approved by the head of the department.

During the implementation of the DP, the DC recommends to the acquirer the necessary sources of information, including regulatory documents, conducts the consultations provided for in the schedule, provides the necessary advice, checks the implementation of the calendar work plan (by stages and in general).

Based on the results of the inspections, the DC sets the DP completion

percentage in accordance with the approved plan. The results of inspections are made public at the department and, if necessary, are discussed at department meetings. Within the set deadline, the higher education applicant reports to the DC and head of the department, who record the DP readiness degree.

2 DIPLOMA PROJECT'S TOPIC

The topics of the DP are determined by the Department of Chemical Engineering and Environmental Protection. They must be relevant, correspond to the current condition and prospects of science and technology development. Titles of topics should be concise, clear and contain unambiguous interpretations. Titles of topic must contain not more than 10 words (excluding prepositions and articles). If it is possible, do not use personal name of enterprise in the title of topic. The topic of the DP can be accepted at the employer's request. DP topic should be aimed at solving environmental problems and increasing the ecosystem sustainability. When choosing a topic, it is necessary to foresee the student possibility in showing initiative and independence in solving the tasks.

The DP topic is developed by the pre-diploma practice consultant from the university and the company with the participation of the graduate student. It is approved by university order and is the official basis for the diploma project completion.

On the basis of the approved topic, the DC develops a diploma design task with an indication of specific development parameters and a schedule for the DP stages implementation. The DC issues the task for the completion of the DP, which is based on the curriculum of the specialty, to the student of higher education within the terms established by department's decision. The schedule of DP implementation is formed jointly by the DC and the student of higher education.

The main directions of the DP topics:

a) ecosystem's condition analysis, a component of which is a specific enterprise, anthropogenic impact factors identification from production on the ecosystem, substantiation and decision-making regarding the anthropogenic impact reducing and increasing the ecosystem sustainability;

b) management and handling situation analysis of production waste, technology and equipment for gaseous, liquid and solid waste separation with mandatory

resolution of issues related to waste certification, their storage, neutralization, processing, disposal, etc.;

c) solving problems related to monitoring, improvement of enterprise waste control methods, modeling and forecasting of environment condition;

d) analysis the ecosystem condition where the production is located, with the specific anthropogenic factors identification that affect ecosystems, followed by the improvement of the technological process and equipment in order to increase the degree of raw materials use, reduce waste and improve the products quality;

c) creation of a territorial industrial complex or a group of enterprises linked by resource cycles; a separate enterprise, shop or site implementing low-waste technology; processes or equipment, in which a reduction of energy and material intensity, an increase in the completeness of raw materials use, and the utilization of high- and low-potential secondary energy resources are provided for;

d) technology and equipment of gas and water treatment facilities of various levels or systems of processing, utilization, destruction or solid waste burial.

Examples of DP topics:

1) General plant facilities for rainwater purification.

2) Wastewater treatment technology development for chemical plant.

3) Improvement of treatment facilities at the chemical plant.

4) Air washer of filters in soda ash production.

5) Environmental impact assessment of dairy farm activities

6) Solving the problem of medical waste disposal

7) Measures to reduce the environmental impact from the activities of a metalworking workshop

As part of the educational program, it is allowed to carry out analytical review DPs, which consist of certain environmental problem in-depth analysis that is important for the country. In this case, the DP should contain an overview of

publications over the past 5 years on the selected topic with data summarization and their systematization, an analysis of global trends and experience in solving similar environmental problems, a comprehensive analysis of implementing ready-made solutions possibilities taking into account the economic and production realities of the country, as well as mandatory a descriptive description of one's own proposals for solving the environmental problem, taking into account the performed review and systematization.

Examples of topics for analytical review DPs:

1. Analysis of environmental legislation in the field of... (specify the field).

2. Analysis of the waste management system (indicate the type of waste) at the state level.

3. Finding ways to solve the problem (indicate a specific problem) taking into account situation in country (name country).

4. Explosive substances on soil surface layer impact analysis

5. Environmental impact analysis and environmental consequences of bitcoin mining

Likewise, within the framework of the existing education program, it is possible to carry out DP, a significant part of which is research work. Research work means:

– an in-depth study of a negative factor impact on individual components condition of the natural environment by experimental means with further experimental data results generalization, as well as recommendations for reducing the impact of the specified negative factor on the selected component;

- sociological studies on environmental awareness formation, in relation to new "green" solutions and other certain groups of the population with a division by age, type of occupation, family and social position, etc. for recommendations (programs, concepts) regarding new solutions development in environmental protection, based on the real attitude of citizens to them, indicating the necessary measures to popularize a specific solution. Residents of communities directly affected by a certain environmental decision or other population may be involved in the survey, depending on the specific goals and objectives of the work;

- a thorough analysis of the existing problem at the local or regional level and grant application formation indicating the sources of funding, the team, the budget and the feasibility of implementing the project, the purpose of which is to improve the condition of natural environment individual components.

Research DPs should take into account the sustainable development concept and aim for its implementation at the level of everyday life in communities, including during production or agricultural activities.

Examples of research DP topics:

1. Study of the influence of (specify what) on the condition of green spaces (specify a specific settlement).

2. Study of the impact of the waste management system adopted in (indicate the name of the locality) (indicate the type of waste) on biodiversity.

3. Research on the sustainable management implementation of (indicate the type of waste) on the community territory (indicate the name of the local community)

4. The activity analysis of volunteer centers for the military needs camouflage means production as sustainable development conception part

5. Impact analyses of a one-time inflow of fresh water large amount on the marine ecosystem

6. The plants use for bioindication of soil pollution

7. Analysis of the mercury-containing waste management system in (country name)

8. Justification the possibility of using biotesting to determine the water quality in (name of river, lake or other water source)

9. Measures to protect pine plantations from trunk and bark pests in (country name) forests

If possible, it is advisable to include a SWOT analysis of an existing enterprise or its environmental management system, or a proposed environmental protection solution, or a grant project, or the environmental situation of the territory in DP.

3 COMPOSITION OF THE DIPLOMA PROJECT

3.1 Requirements for the completion of diploma project documents

The diploma project should generally contain the following documents:

1) title page;

2) documents list of the diploma project;

3) task to complete the diploma project;

4) explanatory note to the diploma project;

5) design documents;

6) technological documents;

7) program documents;

8) posters and other illustrative materials (presentations).

DP documents for foreign students, who had training in English, must be executed in English. Only title pages are made in Ukrainian and also some of them or all can be made in English (if it is necessary for future student’s job)

3.2 Title page

A title page example of the DP is given in the appendix A.

The DP code, which is affixed on the title page, consists of: group index and the number of the topic by order. For example, MIT-M122die.01.

3.3 Documents list

All documents completed in this project and submitted to the examination commission are recorded in the DP documents list. The documents list form is given in Appendix B.

Documents are recorded in information by sections:

– "General documents";

– "Design documents";

– "Technological documents";

– "Program documents";

– "Posters";

– "Illustrative materials";

– "Scientific developments" (if available).

If the DP lacks any kind of documents, the section is excluded.

The first section "General documents" is mandatory. It writes down the task to perform the DP and an explanatory note to the DP.

If a presentation is used during the DP defense it is recorded in the "Illustrative materials" section, scientific developments - in the "Scientific developments" section.

The names of the sections are written in the column "Name of the document" in the form of a title and underlined.

3.4 Tasks for the diploma project

An example of the task implementation on the DP is given in Appendix C.

The task indicates the DP subject, the deadline for submission of the completed DP by the student; output data; concise content of the explanatory note; a list of graphic material; the task given date. The task also specifies the consultants of DP individual sections and the calendar plan for DP stages implementation.

3.5 Explanatory note

3.5.1 Composition of the explanatory note

The explanatory note to the DP is essentially a document that provides a report on the DP performance. An explanatory note is a text document of a scientific and technical nature. The explanatory note must contain the following structural elements in sequence:

1) title page;

2) abstract;

3) content;

4) a list of designations and abbreviations (if available);

5) introduction;

6) literature review;

7) general information about the object;

8) technological part;

9) environmental impact assessment of planned activities;

10) economic part (not mandatory);

11) conclusions;

12) references;

13) appendix (if available).

In the case of analytical and research DPs performance, the main part of the explanatory note may not contain the sections "Technological part" and "Environmental impact assessment of planned activities", but instead contain sections under other names that correspond to the project's topic.

The pages of the explanatory note are numbered with Arabic numerals, placing them in the upper right corner of the page without any signs. Page numbering should be end-to-end for the entire document. On the title page, the number is not put, but it is included in the general numbering.

The DP explanatory note volume (in English) should not exceed: by specialty - 120 pages (minimum volume - 50 pages); on economic justification - 15 pages.

The structural elements of the document "ABSTRACT", "CONTENTS", "LIST OF DESIGNATIONS AND ABBREVIATIONS", "INTRODUCTION", "CONCLUSIONS", "REFERENCES", "APPENDIX" must start on new pages. The names of the structural elements are their headings, which are placed symmetrically in the text. Headings are written in capital letters, not numbered, do not put a period at the end and do not underline.

3.5.2 Title page of the explanatory note

The title page is the first page of the explanatory note. It is included in the total number of pages, but the page number is not inserted. An example of the explanatory note title page to the DP is given in Appendix D, Appendix E.

3.5.3 Abstract

The abstract is a concise summary of the document text content, which contains the main information and conclusions necessary for the initial familiarization with the

document. The abstract should contain: information about the scope of the document; list of keywords; the text of abstract. It is recommended to separate these components from each other with a free line.

The length of the abstract should not exceed one page.

Information about the document volume includes: the number of pages of the document, the number of illustrations, tables, references and appendices. The record form is given in the example

Example

The diploma paper contains: 99 pages, 32 figures, 9 tables, 38 references, one appendix

A keyword is a word or phrase from the text that are most relevant for information contained in a document. Generally accepted scientific and technical terms are used as keywords (see example)

Example

Key words: MERCURY-CONTAINING WASTE, FLUORESCENT LAMPS, HAZARDOUS WASTE, EU DIRECTIVES, METALLIC MERCURY, DUST.

The text of the abstract should reflect the main content of the document, including such aspects as the object (subject), purpose, methods, results of research or development. The text of the abstract is not divided into points.

The abstract is performed in English. The pages of the abstract are not numbered and are not included in the total number of document's page.

3.5.4 Contents

The numbering of explanatory note pages begins with the number 2 on the table of contents.

In the general case, the following is written in the table of contents:

- list of designations and abbreviations;
- introduction;
- names of sections, subdivisions;
- conclusions;
- references;

- appendix.

The names of the sections and subsections are indicated together with their serial numbers, the appendices - with their designation and name. All names are written in lowercase letters with the first capital letter.

Numbers and names of subsections are given after a paragraph indent equal to two characters (0.5 cm) relative to the numbers of sections (subsections).

If it is necessary to continue recording the name of the section, subsection on the second (next) line, it is started at the level of this name beginning on the first line, and when continuing the recording appendix name - at the level of recording the appendix designation.

The pages numbers on which the names of the elements are placed indicate the last line level one below the other. The word "page" or its abbreviation is not written. The endings of elements headings are separated from the page numbers by punctuation (periods). Example of design - see "Contents" of these methodological guidance.

3.5.5 List of designations and abbreviations

If the text of the document uses conventions, abbreviations, symbols, units of measurement that are not provided for by current standards, as well as specific terminology, then their list should be presented in the form of a separate list.

The list should be arranged in a column, in which conventional designations, abbreviations, etc. are given in alphabetical order on the left, and their detailed interpretation is on the right.

The list is given in the following order: abbreviations (including abbreviations); conditional (letter) designations; symbols of chemical elements and compounds; unit of measurement; terms. For letter designations, the following order of entry is established: first, conventional designations of the English alphabet should be listed in alphabetical order, then - Latin, and lastly - Greek.

Irrespective of the list existence, when the first designations (abbreviations) appearance in the text, their transcription should be provided.

3.5.6 Introduction

In the introduction, it is necessary to give a brief description of the scientific (technical) problem (question) current state, to which the project is devoted, to outline the global trends in solving the tasks, to note the relevance, expected results of the topic being developed.

In the introduction to the master's DP, attention is paid to it’s innovative component. If the project has a research direction, it is allowed to indicate the work’s purpose and tasks, the research’s object and subject, elements of scientific novelty, practical significance, methods of scientific research, results approbation, without using headings.

In the presence of own scientific developments, a published articles and patents list is given in the introduction and the higher education applicant's own contribution to their creation is indicated. The introduction should not take more than 1 (one) page. The text of the introduction is not divided into paragraphs. The introduction cannot contain figures, tables, etc.

3.5.7 Literature review

The functional purpose of this section is to justify the need to implement the DP. This section contains a detailed overview of published works in historical terms and problem modern vision under consideration (articles, patents, copyright certificates, technical projects, other materials related to the problem).

In accordance with the hypothesis, issues are analyzed that, in the author’s opinion, are insufficiently studied or require new explanations or solutions. The student should not quote the content of the sources verbatim, but conduct an analysis of what was done and what was left out of other authors attention, which can give a new direction of scientific research or a technical solution. This section should end with a concise summary that begins with the words "Thus", after which it becomes clear the need to perform the work and its main tasks. This section should not exceed 20 pages.

3.5.8 General information about the object

In this section, the physical-geographical and climatic characteristics of the area where the facility is located are provided. Data on manufactured products are provided. A list and characteristics of environmental impact sources are provided, indicating the volumes of the actual pollutants concentrations and their permitted concentrations in the case of discharge or emission, or with the land areas definition that are alienated for solid waste storage. Objects whose impact on the environment exceeds regulatory indicators are singled out.

3.5.9 Technological part

This section provides data on the DP object or the technological process description, theoretical generalizations, physico-chemical models, the decisions made justification, determination of prospective directions and corresponding calculations, specific technical solutions (or others) to increase the ecosystems sustainability.

Calculations include:

1 Gas emissions and (or) wastewater purification level required by sanitary standards.

2 Analysis of effluents and emissions reuse possibility, possible measures for their utilization or processing. The proposed schemes must be justified on physical and chemical processes basis, their kinetics, the degree of raw materials use, material and heat balances.

3 Description and technological calculations of the main equipment, machine or equipment for environmental protection purposes. Here the flow models in the equipment, justification of the type (structure), equipment technological calculation with determination of its volume and dimensions, the necessary hydrodynamic calculations, etc. should be determined.

The section’s final stage is the environmental protection analysis of measures developed in the project taking into account sanitary and hygienic indicators and norms of anthropogenic load on the environment. The obtained results should be compared with the known ones.

3.5.10 Environmental impact assessment of the planned activity

Environmental impact assessment is considered only for those components of the environment on which the projected activity results [2, 3]. At the same time, for each component of the environment, the next is given:

- the impact list that is being considered, taking into account the scale and significance of the consequences, its characteristics, level of danger;

- influence zones substantiation from the activity under consideration;

- current conditions description and assessment of normative indicators taking into account emergency situations;

- substantiation of measures to prevent or limit exposure, assessment of their effectiveness and residual impact characterization.

3.5.11 Economic part

The section is devoted to the economic evaluation of nature protection measures effectiveness that are developed in the work. Also, other economic calculations based on the DP topic can be given here.

3.5.12 Conclusions

The conclusions should briefly state the work results and proposals for its use, as well as give technical and economic efficiency assessment of the work result and its implementation. In the presence of own scientific developments, this fact is reflected in the conclusions.

Conclusions should be concise. All conclusions must follow from the essence, correspond to the work purpose and tasks.

3.5.13 References

The list references is a list of cited, reviewed, mentioned and used sources of information. The sources of information are: books, articles, regulatory and technical documents, reports on scientific and research work, dissertations, technical and economic standards and norms, price lists, abstracts and reviews published as separate documents.

All sources of information should be referenced in the main part of the explanatory note. In references, bibliographic descriptions are arranged in the order in which the sources are first mentioned in the text. The serial numbers of the descriptions in the references are the reference numbers to them [4,5].

The bibliographic description of references included in the list is compiled in the form in which they are given in the references (on the title page, the back of the title page and other elements of the document containing the original and similar information) taking into account the APA style requirements.

APA style uses the author/date method of citation in which the author's last name and the year of the publication are inserted in the actual text of the paper. Example of APA style for references are given in Appendix F.

The language of the bibliographic description must correspond to the reference's language of the original information (title page, back of the title page, etc.). The references should include no more than 80 sources.

3.5.14 Appendices

Appendices can contain:

- additional illustrations or tables;
- materials that cannot be included in the main part due to the large volume or form of presentation (photos, intermediate mathematical proofs, instructions, methods, algorithms, calculation results, etc.);
- an additional list of sources to which there were no references in the text, but which may be of interest.

All appendices should be referenced in their respective sections. Appendices with their designation and name should be included in the table of contents.

Appendices are a continuation of the document, are placed from a new page, and have the same page numbering as the document. It is allowed to place two or more sequentially located applications on the same page, if they can be completely placed on this page. Appendices are marked consecutively with capital letters of the Latin alphabet, except for I and O. Letter designations are provided in alphabetical

order without repetition and, as a rule, without gaps. For example, APPENDIX A, APPENDIX B.

If there is only one appendix, it is also marked as APPENDIX A.

The word "APPENDIX ___" is placed symmetrically in the text.

The appendix must have a title, which is placed under the word "APPENDIX ___" symmetrically to the text and executed in lowercase letters from the first capital letter. One free line should be left between the word "APPENDIX___" and the title. The text of each appendix can be divided into chapters, subsections, paragraphs and sub-paragraphs, which are numbered within the appendix. For example: A.3. . . (third section of appendix A).

Illustrations, tables and formulas are numbered within each appendix. If the appendix is divided into sections, then the numbering of illustrations, tables, and formulas should also be within the appendix. If there is one table, figure or formula in the appendix, they are also numbered. For example: Figure A.1 is the first figure of Appendix A.

Appendices can be copies of independent documents that do not differ from the original. In this case, a sheet should be placed in front of the copy, on which the word "APPENDIX ___" and its name are written in the middle. The pages of the copies are numbered, continuing the page numbering of the document.

4 REQUIREMENTS FOR DIPLOMA PROJECT TEXT PRESENTATION

4.1 General requirements

The explanatory note to the DP is drawn up in accordance with [6].

The explanatory note is made on A4 format (297×210 mm) sheets of printing paper. When creating tables, illustrations and appendices, it is allowed to use the A3 format (297x420 mm). A3 format sheet is hemmed into a document on a side of 297 mm and folded to A4 format.

Sheets must have margins: left, lower and upper – at least 20 mm, right – at least 10 mm.

The explanatory note text is written on one side of the sheet at intervals of one and a half, 14 pt font, 12 pt font is allowed for text elements (tables, notes, etc.), the recommended font is Times New Roman.

4.2 Text structure

Depending on its semantic content, the explanatory note text is divided into sections, if necessary - into subsections.

Sections and subsections are divided into points; points, if necessary, into sub-points. Items and sub-items can have lists.

Sections, subsections, clauses, subsections must have serial numbers.

The number is written from the paragraph in Arabic numerals. The height of the numbers should be equal to the height of the capital letters in the text. Do not put a period at the end of the number.

Sections should be numbered throughout the document (1, 2, 3, etc.). Subsections - within the section (1.1, 1.2, etc.); points - within the section (1.1, 1.2, etc.) or subdivision (1.1.1, 1.1.2, 1.1.3, etc.); subsections - within the clause (1.1.1.1, 1.1.1.2, 1.1.1.3, etc.).

If a section or subsection consists of one clause, or a clause consists of one subsection, they are not numbered.

If an element of a higher level of subordination has information related to all

elements of a lower level, then this information is placed immediately after the title of the structural element of a higher level and is not numbered. This information should not exceed 5-7 sentences.

Lists in the text are indicated in one of the ways:

- Arabic numbers with brackets;

- lowercase letters of Latin alphabet with a parenthesis (except for the letters i, o);

- with a hyphen.

A colon is placed after the word preceding the lists. The text of the lists together with the notation begins with a paragraph and is executed in lowercase letters, a semicolon is placed at the end of the lists (except for the last one, after which a period is placed). The second (subsequent) lines of the lists should start from the border of the field.

Further detailing of the lists is allowed (second level). In this case, they are recorded from the paragraph relative to the lists of the first level.

Example

Environmental factors are divided into:

1) abiotic;

2) biotic:

a) zoogenic;

b) phytogenic;

c) microbiogenic;

d) anthropogenic.

If the lists consist of several complete phrases, they are marked with Arabic numerals without brackets and periods, begin with a capital letter and are separated from each other by a period.

Example

Sorption methods for gas emissions purification are divided into two groups:

1 Absorption methods - in which absorption of gaseous components from emissions is carried out by liquid absorbers.

2 Adsorption methods - in which absorption of gaseous components from

emissions is carried out by solid porous absorbers.

Sections and subsections must have headings. Clauses and sub-clauses can also have headings if necessary. Headings (names) of sections, subsections, points, subsections should reflect their content and be short and precise. Do not put a period at the end of the title. If the title consists of two sentences, separate them with a period. Shifting of words in headings is not allowed.

Headings of sections are written in capital letters in bold and placed symmetrically in the text. It is allowed to place section headings from a paragraph.

Headings of subdivisions, clauses and sub-clauses are written in small letters with the first capital letter in bold type and are arranged from a paragraph.

One free line (21 pt.) must be left between the section title and the subsection title or the following text. Between the title of the subdivision and the title of the item, as well as between the title of the subdivision (item, sub-item) and the following text, the interval should be the same as in the text.

One free line (21 pt.) must be left between the previous text and the title of the section or subsection. Between the previous text and the item title (sub-item), the interval should be the same as in the text.

It is recommended to start each section of the explanatory note on a new page. It is not allowed to place the heading of a section, subsection, item or sub-item at the bottom of the page if only one line of text is placed after it.

4.3 Text elements

Elements of the text are: formulas and equations; tables; illustrations; abbreviation; numbers and signs; units of physical quantities; examples; notes; link.

4.3.1 Formulas and equations

Formulas are placed along the text or in separate lines.

Simple formulas are placed in the text, and basic formulas used in calculations and research are placed in separate lines. Only one formula can be placed in one line. Formulas are placed symmetrically to the text; leave one free line above and below each formula. Spacing between formulas that follow each other should be as in the

text.

It is allowed to transfer the continuation of the formula to the next line only on the signs of the performed operations, and the signs at the beginning of the next line are repeated. When transferring to multiplication operations, the sign (×) is used. Formulas that follow one another are separated by a comma. A period is placed at the end of the formula, which is the sentence end.

Quantities signs explanation and numerical coefficients, if they are not explained earlier in the text, should be given directly under the formula on a new line from the paragraph starts with word "where" without a colon in the sequence in which they are given in the formula; a comma is placed after the formula. The spacing between the formula and the explanation and between the explanation and the subsequent text should be the same as in the text.

If it is necessary to indicate the numerical value of the quantity, then it is recorded after decoding.

Example

$$E = \frac{m \cdot V^2}{2}, \qquad (4.1)$$

where E – kinetic energy, J;

m – material point mass, equal to 0.5 kg;

V – speed of movement, equal to 30 m/s.

It is not allowed to write the signs of physical quantities units next to the formula expressing the dependence between the quantities in letter form:

correct: V = s/t;

incorrect: V = s/t, m/s.

The letters of the units included in the product are separated by a dot on the middle line, as a multiplication sign.

Example

N m; A · m^2.

Formulas can be numbered. Only the main calculation formulas and formulas to which a reference must be made should be numbered. The numbering of the formulas should be within the section (see formula 4.1).

When transferring the formula to the next line (page), the number is indicated

at the level of the last line.

4.3.2 Tables

For ease of presentation and text reading, digital and other indicators are recommended to be drawn up in the form of a table. All tables should be referenced in the text. Tables must be numbered. They are numbered within the section.

The number is written after the word "Table", the entry is made above the table on the left side. The table can have a name that should reflect the table content and be short. It is written after the number through a dash with lowercase letters from the first capital. The table header must be separated by a line from the rest of the table. If necessary, it is allowed to include a line for numbering the graph with Arabic numerals under the head of the table. The table rows height should be at least 8 mm. Diagonal lines are not allowed to separate the headings and subheadings of the sidebar and graph.

It is recommended to leave one free line at the top and bottom of the table.

Depending on its size, the table can be placed: after the text in which it is mentioned; on a separate next page; in the appendix to the document text. It is allowed to place the table along the long side of the sheet. If the table rows or columns exceed the page format, it is divided into parts, placing one part under the other, or transferred to the next page.

The table is drawn up as shown in fig. 4.1. and Appendix G

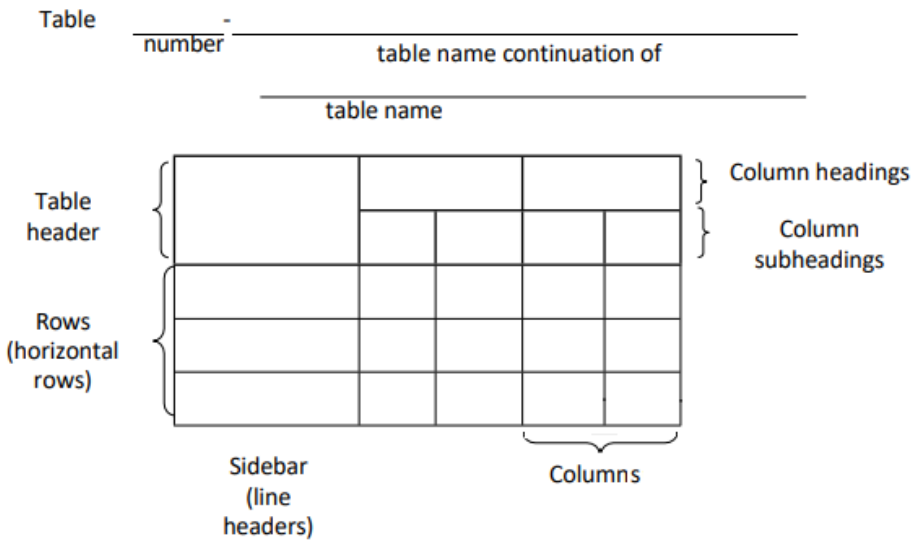


Figure 4.1 - Table’s performance

In each part, its head and side are repeated or replaced by a line with the numbers of the graphs (columns), which are indicated in the table's first part. At the same time, the word "Table", its number and name are placed only above the first part of the table, and above the other parts on the left side it is indicated: "Continuation of table __", and above the last part - "End of table __".

If, when dividing the table into parts, the table is interrupted from the bottom, then in the first part of the table, the lower limiting horizontal line may not be drawn, (as at fig. 4.2).

Table._____- Parameters of washers...

In millimetres

Nominal thread diameter of bolt, screw, stud	Inner diameter of the washer	Washer thickness					
		light		normal		heavy	
		s	b	s	b	s	b
2,0	2,1	0,5	0,8	0,5	0,5	0,6	0,6
2,5	2,6	0,6	0,8	0,6	0,6	0,8	0,8
3,0	3,1	0,8	1,0	0,8	0,8	1,0	1,0

End of table _____

In millimetres

Nominal thread diameter of bolt, screw, stud	Inner diameter of the washer	Washer thickness					
		light		normal		heavy	
		s	b	s	b	s	b
4,0	4,1	0,8	1,2	1,0	1,0	1,4	1,4
...	...	...	...	...	...	...	...
48,0	48,5	7,0	12,0	-	10,0	-	-

Figure 4.2 – Dividing table in several parts

Tables with a small graphs number can be divided into parts and placed one part next to the other, separating them with a thick line, while the table head is repeated (as at fig. 4.3).

Table._____

The diameter of the crane rod of the saw part, mm	Weight of 1000 pcs of steel washers, kg	Diameter of the fastener rod, mm	Weight of 1000 pcs of steel washers, kg
1,1	0,045	2,0	0,192
1,2	0,048	2,5	0,350
1,4	0,111	3,0	0,552

Figure 4.3 – Example of table with small graphs number

If it is necessary to explain individual data given in the table, then these data should be marked with a superscript footnote. Footnotes to the table are drawn up in accordance with paragraph "Footnotes".

If the table has footnotes and notes, then at the table end, the footnotes are given first, and then the notes.

Graphs and rows headings of the table should be written with a capital letter. Subheadings are written in lowercase if they form one sentence with the title, and in uppercase if they have an independent meaning. Do not put a period at the headings end and subheadings of tables. Graph headings and subheadings are written in the singular.

Graphs headings, as a rule, are written parallel to the table rows. If necessary, a perpendicular arrangement of graph headers is allowed.

If it is necessary to number indicators, parameters or other data, serial numbers should be indicated in the first table column (side) immediately before their name. Serial numbers are not placed before numerical values of quantities and designations of types, brands, etc.

Designations of physical quantities (indicators, parameters) are indicated in the side of the table after their names separated by a comma.

Text repeated in columns (in the absence of horizontal lines) is allowed:

- replace with quotation marks if it consists of one word;

- replace with the words "the same", if it consists of two or more words, at the first repetition, and then with quotation marks;

- replace with the words "the same" with the addition of extra information, if only part of the phrase is repeated;

– specify the value of the parameter once (at the level of the middle row), if it is the same for several rows.

It is not allowed to put quotation marks instead of repeating numbers, brands, signs, mathematical and chemical symbols. If digital or other data are not indicated in the graphs, it is necessary to put a dash.

4.3.3 Illustrations

To explain the text being taught, it is allowed to illustrate it with diagrams, schemes, drawing, photographs, etc. Illustrations placed in the text should have the caption "Figure". All figures must be referenced in the text.

The execution of drawings and diagrams, which are illustrations, must meet the requirements of the Unified system of design documentation (ESKD) standards.

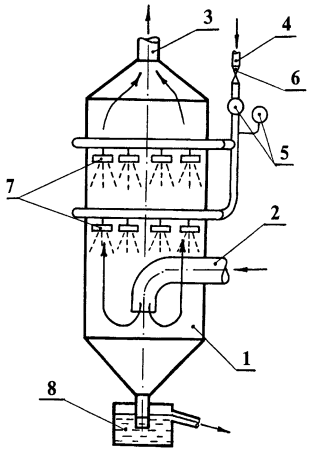
As a rule, a figure should be placed after the first mention of it in the text. The figure is placed symmetrically to the text. It is recommended to leave one free line at the top and bottom of the picture. If there are several figures in the section, it is allowed to place them in the order of numbers at the section end or make them in the form of appendices.

Figures must have serial numbers and may have names and explanatory data (subfigure text).

Numbering of figures should be within the section boundaries.

The figure name should reflect the figure content and be concise. It is placed symmetrically with a drawing after the number through a dash and is performed with lowercase letters starting with the first capital. The word "Figure" should be written in full.

The sub-figure text is placed above the name of the figure, as shown in fig. 4.4.



1 – cylindrical body; 2 – inlet pipe; 3 – nozzle for removing purified gas; 4 – supply of water for irrigation; 5 – control and measuring devices for water parameters; 6 – regulating latch; 7 – nozzle of the upper and lower tier of irrigation; 8 – hydraulic valve

Figure 4.4 – Jet scrubber

If the drawing is placed on several pages, then on the first page is placed the entry "Figure ___" and its name (if available), on the following pages - "Continuation of figure __", and on the last - "End of figure ___". The accompanying text is placed on the page where it is necessary.

If a reference to a picture is followed by a review of the illustrated material, then the word "figure" is written without a number in the story. For example: "As can be seen from the figure...".

4.3.4 Abbreviation

As a rule, words in the text cannot be abbreviated. An exception is abbreviations of words and phrases established in the relevant state standards or generally accepted in the language in which the document is drawn up.

Abbreviations of words and phrases characteristic of a certain industry or activity field (use of highly specialized terms) are allowed. The following abbreviations are recorded in one of the following ways: directly in the text (in brackets after the full name at the first mention), if each of them is repeated no more than 3-5 times, for example: "Sanitary and protective zone (SPZ)", or in the list of designations and contractions (with more repetitions).

If the name consists of several words, it is recommended to write it in abbreviated form when it is repeatedly mentioned in the text. For this, when mentioning the full name, write "further" and its accepted abbreviation in parentheses. For example: "Drying oven (further - oven)".

The words maximum and minimum are used in abbreviated form only for indices. For example: Umax, Umin. In the text, these words should be written in English: maximum, minimum.

4.3.5 Numbers and signs in the text

Abstract numbers up to nine are written in words, more than nine in numbers. Numerical values of physical quantities with units of measurement must be written in numbers.

Examples

1 Five soil samples were taken.

2 15 tests were conducted.

3 Pipe 1 m long; mass – 8 kg.

4 The cost of one meter is 6$.

Fractional numbers are written only in numbers in the form of decimal fractions, except for dimensions in inches, which should be written in the form: 3/4″

If the numerical value cannot be expressed in the form of a decimal fraction, then it is allowed to write it as a simple fraction in one line through a slash.

Example:

5/32;

$(50a - 4c) / (4b + 20)$.

Ordinal numerals are written with numbers accompanied by shortened case endings.

Example:

2nd line; 5th part.

Dates are written without case endings.

Example:

March, 8; June, 28, but: in the 40s; the 70s.

Case endings are not written with Roman numerals.

Example:

at the XX Olympic Games, XXI century.

When specifying limiting norms, the words: "no less" or "no more", "from", "to", "over" are written before numerical values.

Example:

The coating thickness is no more than 0.2 mm.

When specifying a range of values, it is recommended to use a dash or a backslash "from ... to".

Example:

Coating thickness 0.2–0.5 mm; sizes from 30.0 to 50.0 mm.

For values with units of measurement "%", "°C", "°", the range of values should be written as follows: 65%–70% or using the inversion "from ... to".

The return "from ... to" must be used if the range of values contains negative values.

Example:

From minus 5 °C to plus 8 °C. From – 10 °C to + 6 °C.

In the text, it is not allowed to use without numerical or letter values:

– mathematical signs: – (minus); > (more); < (less); ≥ (greater than or equal to); ≤ (less than or equal to); = (equal); ≠ (not equil); 0 (zero); log (logarithm); sin (sine); cos (cosine), etc.;

– signs: # (number); % (percentage); °C (degrees Celsius); ∅ (diameter), etc.

The signs "#", "%" and "°" are not doubled when indicating a plural number.

4.3.6 Units of physical quantities

In the text, values should be expressed in units:

– SI (basic, additional, derived), decimal, multiple;

– admissible for use along with SI units.

The use, designation and writing of physical quantities units must comply with ISO 80000-1:2009; ISO 80000-1:2009/Cor.1:2011 Quantities and units – Part 1: General.

The use of different systems for the same unit of physical quantity in the text document is not allowed.

4.3.7 Examples and notes

Notes are given if necessary explanations or reference data to the text, tables or illustrations content

Notes are placed immediately after the text, illustration or table to which they relate. Notes to the table are placed above the line marking the table end, and are separated from the main part of the table by a thin solid line.

Notes are made with minimal line spacing.

The word "Note" is printed in the 12-point font of the paragraph with a capital letter and is not underlined. A period is placed after the word "Note" and the text of the note is provided in capital letters on the same line. One note is not numbered, for

example:

Note. _____

If there are several notes, they are numbered with Arabic numerals without a period. In this case, write the word "Notes", put a colon after it and from a new line of the paragraph with a capital letter together with the serial number give the text of the note text, for example:

Notes:

1 _____

2 _____

Examples are given in those cases when they explain the document text content or contribute to its more concise presentation.

Examples are placed immediately after the text that needs explanation. The words *"Example"*, *"Examples"* are written in italics and placed on a separate line from the paragraph without punctuation marks. If the text of the example is placed on the same line as the word "Example", then the word "Example" is followed by a period. If there are several examples, they are numbered in the same way as notes.

4.3.8 Footnotes

If it is necessary to explain individual data in the text or table, it is allowed to use footnotes.

Footnotes are marked with superscripts. The footnote sign is made with Arabic numerals with a bracket and placed at the level of the upper edge of the font. For example, "...pressing unit $^{3)}$...".

It is allowed to mark footnotes with asterisks (*) instead of numbers. The use of more than four stars is not allowed.

The footnote sign is placed immediately after the word, number, symbol, sentence to which the explanation is given, as well as in the footnote itself before the explanation text. Footnotes related to the text are placed from the paragraph at the page end on which they are marked, and are separated from the text by a short thin horizontal line up to 40 mm long on the left side. Footnotes related to table data are placed above the line that marks the table end and are separated from the main part of

the table by a thin solid line.

Numbering of footnotes is separate for each page and table.

The text of the footnote is executed with a minimum interline interval in 12p font.

4.3.9 Links

The document may contain links to: for this document; on standards, technical conditions and other documents.

When referring to a section, subdivision, item, sub-item or list of this document, it should be written: "...according to section 3..."; "...according to 3.1..."; "... in accordance with 4.2.2..."; "... specified in list 2) 4.1.4...".

References to tables, illustrations, formulas and appendices of this document are given as follows:

– "... given in table 2.4";

– "... presented in table 6.1";

– "... according to figure 3.2..." or "... from fig. 3.2" ;

– "... shown in figure 3.4" or "... shown in fig. 3.4"

– "... in formula (2.1)..."; "... as can be seen from formula (2.1)...";

– "... presented in Appendix A"; "… given d in Appendix A."

For repeated references, write:

– "... see table 6.1";

– "... see figure 2.4" or "... see Fig. 2.4";

– "... see formula (2.1)".

References to sources of information of this document are indicated in the text by serial numbers in square brackets as follows: "... in works [3, 4]..."; "... [7, table 34, p. 98]…"; "... [5, p. 18] ...".

The serial number of the source is given as the reference to it appears in the text. With repeated references to the same source, its number is repeated. When referring to standards and technical conditions in the text, it is allowed to submit only their designation without the year of approval. When referring to other regulatory documents, it is necessary to indicate their designations and names.

5 REQUIREMENTS FOR DIPLOMA PROJECT PRESENTATION

Illustrative materials are performed in electronic form (presentation), while the presentation of such elements as numbers and signs, units of physical quantities, formulas, tables, drawings, etc. must meet the requirements of STZVO-KhPI-3.01.

Illustrations of the explanatory note materials, as well as the results of execution of design, technological and program documents may be involved in the presentation. The presentation should be printed on sheets of white paper in A4 format and have a title page (pages). Title page (pages) of presentation must indicating the DP topic, student’s name and group, DC name and position (see Appendix H) and made both in Ukrainian and English.

The printed presentation should be hemmed at the explanatory note end.

The presentation can be made with Powerpoint, Google slides, or Keynote slides or another program. Make sure to prepare an appropriate number of slides. A general rule is to use about 10-15 slides for a 20-minute presentation. You can prepare your slides by using information from your thesis' first chapter (the overview of your thesis) as a framework or outline. Substantive information in your thesis should correspond with your slides.

Make sure your slides are of good quality – both in terms of the integrity of the information and the appearance. Do not use photo as background of slides, choose correct colors for background and words. Use figures, drawings, schemes of high quality.

6 REQUIREMENTS FOR COMPILING THE DIPLOMA PROJECT DOCUMENTS

DP documents: title page, list of documents, task and explanatory note (in this order) should be folded into the cover.

DP documents made on A4 and A3 format sheets, if there are no references to them in the text (for example, technological process, specification), can be placed after the explanatory note (they are not appendices).

Scientific developments - copies of articles and patents, abstracts of reports of scientific-technical and scientific-practical conferences, symposia, congresses, etc. should be hemmed at the end of the explanatory note.

7 COMPLETION OF WORK ON THE DIPLOMA PROJECT AND ITS DEFENSE

The student submits the completed DP, signed by the consultants and the standards controller, to the DC. DC evaluates the DP readiness for defense based on the task performance and the calendar plan, signs the DP and makes a written review characterizing the work done by the student.

On the basis of DC's feedback and signatures, consultants and standards controller, the head of the department makes a decision on the admission of the applicant to the defense and puts his signature on the DP title page. After that, the student submits the full DP electronic version to the department by the deadline set by department decision, but not later than 1 day before the deadline, allocated according to the schedule of NTU "KhPI" educational process, for its subsequent placement in the Electronic "Repository qualifying graduation theses of higher education applicants at the National Technical University "Kharkiv Polytechnic Institute".

The file format and file names of documents are formed in accordance with the "Instructions on the archiving technology in the electronic repository of qualifying graduation theses of higher education applicants at the National Technical University "Kharkiv Polytechnic Institute".

In the case that the head of the department does not consider it possible to admit the student to the DP defense, this problem is considered at department meeting with the DC participation. The protocol of the department meeting is submitted to the director of the institute for approval, and then to the rector of the higher education institution for approval.

DPs admitted to defense by the graduating department are submitted for review. The composition of reviewers from among production specialists and scientific organizations is approved by the vice-rector based on the submission of the relevant department. In their conclusions, the reviewers note the relevance of the development (research) topic, novelty, student's specific personal participation in

obtaining the results presented in the project, the substantiation degree of scientific (practical, organizational) provisions. The reviewer puts his signature on the title page of the explanatory note.

The DP together with feedback and review is submitted to the examination committee for defense.

The DP public defense is held at the meeting of the examination commission, the date of which is set by rector's order. In the defense process, the examination commission examines the submitted materials: the explanatory note and the graphic part of the project (if this part is exist), as well as listens to the diploma student's report (up to 15 minutes) and his/her answers to questions on the topic.

When protecting a DP, it is allowed to submit illustrative material in electronic form (presentation). In this case, all examination commission members should be provided with handouts duplicating the slides.

The following issues are taken into consideration in the evaluation and grading master's theses:

- justification of the relevance of the research topic from academic and/or practical perspectives;
- logic of the thesis structure, clarity and persuasiveness of argumentation (including proper citation and referencing);
- scope and depth of theoretical and methodological review;
- scientific novelty of the results;
- appropriateness of the selected research methods;
- comprehensiveness and depth of the data analysis;
- scope and relevance of practical recommendations;
- quality of argumentation and comprehensiveness of the feasibility study;
- quality of the appearance of the thesis (including graphic presentations and tables);
- quality of the oral presentation of the results during the defense procedure.

Criteria for diploma paper evaluation are given in table 7.1, the results of the defense of master's theses are evaluated using the European Credit Transfer System

(ECTS) (on the scale "A", "B", "C", "D", "E", "FX", "F"); a100-point scale; and the national system ("excellent", "good", "satisfactory", "unsatisfactory") and given in table 7.2

Table 7.1 – Descriptors of criteria for evaluating a master's paper

Criteria for evaluating	Description according to the scale of the national evaluation system		
	”satisfactory»	“good”	“excellent”
The use of information resources	The necessary literary sources have been revised		
		Own evaluation of the used literary sources	
Logical and argumentative presentation of the material	The subject on the basis of the research object is disclosed		
		Selected theoretical and practical material is analyzed, presented logically and argued	
			A formalized model of the problem was built
The correctness of using statistical, mathematical and other methods	Relevant information and statistical databases were analyzed		
			The latest research methods are used
Possession of generalization skills	The hierarchy of concepts is applied, the general properties of objects are established	The properties of objects that are on the border of subject fields have been established	Correct methods are applied for solving problems that are on the verge of subject areas
Initiation and substantiation of approaches and directions for solving the investigated problem	The proposals are formulated in general, the calculations are approximate	Proposals are reasoned, confirmed by calculations	The proposals are substantiated, formulated clearly and in detail, confirmed by calculations
Scientific value	The results of the scientific study have not been published	Abstracts of the conference based on the results of scientific research were prepared or were publishedin scientific publications including conference	
Language, style and overall design of the work	Minor style violations, design with comments	Scientific style, design with minor comments	Scientific style, design without comments
Report	The topic and main results are outlined	The topic is outlined, the main results, the proposals are reasoned	The topic, research methods, research results, proposals are defined. The conclusions clearly correlate with the research results
Illustrative material	The main results of the study were presented	Visualized research results (findings), suggestions and conclusions	
Completeness of the answer to the commission`s questions	In general, provided	Provided in sufficient detail	Provided in detail and reasoned

Table 7.2 – Scales for diploma paper evaluation and their meaning

National	ECTS	100-point	Explanation
5	A	90-100	Excellent
4	B	82-89	Very Good
	C	75-81	Good
3	D	64-74	Satisfactory
	E	60-63	Sufficient (Satisfactory)
2	FX, F	<60	Failed (Unsatisfactory)

REFERENCES

1 Дипломні проєкти та дипломні роботи. Загальні вимоги до виконання [Текст] : СТЗВО-ХПІ-2.01-2021 ССОНП – Чинний з 2022–01–01. – Х.: НТУ«ХПІ», 2021. – 30 с. https://blogs.kpi.kharkov.ua/v2/metodotdel/wp-content/uploads/sites/28/2022/12/STZVO-HPI-2.01-2021-SSONP.-Diplomni-proekti-ta-diplomni-roboti.-Zagalni-vimogi-do-vikonannya-zi-zminami.pdf

2 Environmental Impact Assessment Handbook – [Електронний ресурс] https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf

3 Environmental Impact Assessment. Training Resource Manual [Електронний ресурс] https://wedocs.unep.org/bitstream/handle/20.500.11822/26503/EIA_Training_Resource_Manual.pdf?sequence=1&isAllowed=y

4 Бібліографічний запис. Бібліографічний опис. Загальні вимоги та правила складання [Текст] : ДСТУ ГОСТ 7.1:2006 : (ГОСТ 7.1–2003, IDT). – Чинний з 2007–07–01. – К., 2007. – 58 с. – (Система стандартів з інформації, бібліотечної та видавничої справи) (Національний стандарт України).

5 Упровадження в практику роботи бібліотек освітянської галузі ДСТУ ГОСТ 7.1:2006 «Бібліографічний запис. Бібліографічний опис. Загальні вимоги та правила складання» та ДСТУ ГОСТ 7.80:2007 «Бібліографічний запис. Заголовок. Загальні вимоги та правила складання» : практ. посіб. / НАПН України, Держ. наук.-пед. б-ка України ім. В. О. Сухомлинського ; [уклад.: І. Г. Лобановська, О. Г. Помчалова, 1. С. Хибник, ; наук. ред. І. Г. Лобановська]. – К., 2010. – 95 с.

6 Текстові документи у сфері навчального процесу. Загальні вимоги до виконання [Текст] : СТЗВО-ХПІ-3.01-2021 ССОНП. – Чинний з 2022–01–01. – Х. : НТУ«ХПІ», 2021. – 48 с. https://blogs.kpi.kharkov.ua/v2/metodotdel/wp-content/uploads/sites/28/2022/12/STZVO-HPI-3.01-2021-SSONP.-Tekstovi-dokumenti-u-sferi-navchalnogo-protsesu.-Zagalni-vimogi-do-vikonannya-zi-zminami.pdf

APPENDIX A

Diploma project's title page in Ukrainian

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ «ХАРКІВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ»

Інститут Навчально-науковий інститут механічної інженерії і транспорту
Кафедра «Хімічна техніка та промислова екологія»
Спеціальність 101 Екологія
Освітня програма Інженерна екологія

До захисту допускаю
Завідувач кафедри
Олексій ШЕСТОПАЛОВ
(ім'я та прізвище)

_____
(підпис, дата)

ДИПЛОМНИЙ ПРОЄКТ
другого (магістерського) рівня вищої освіти

Тема проєкту **Розробка заходів щодо зменшення викидів від фарбувальних установок**

Шифр проєкту МІТ-М122.07
(група, номер теми за наказом)

Виконавець Шевченко Олена Іванівна
(прізвище, ім'я, по батькові)

Керівник доцент Петров Іван Петрович
(посада, прізвище, ім'я, по батькові)

Харків 2024

APPENDIX B

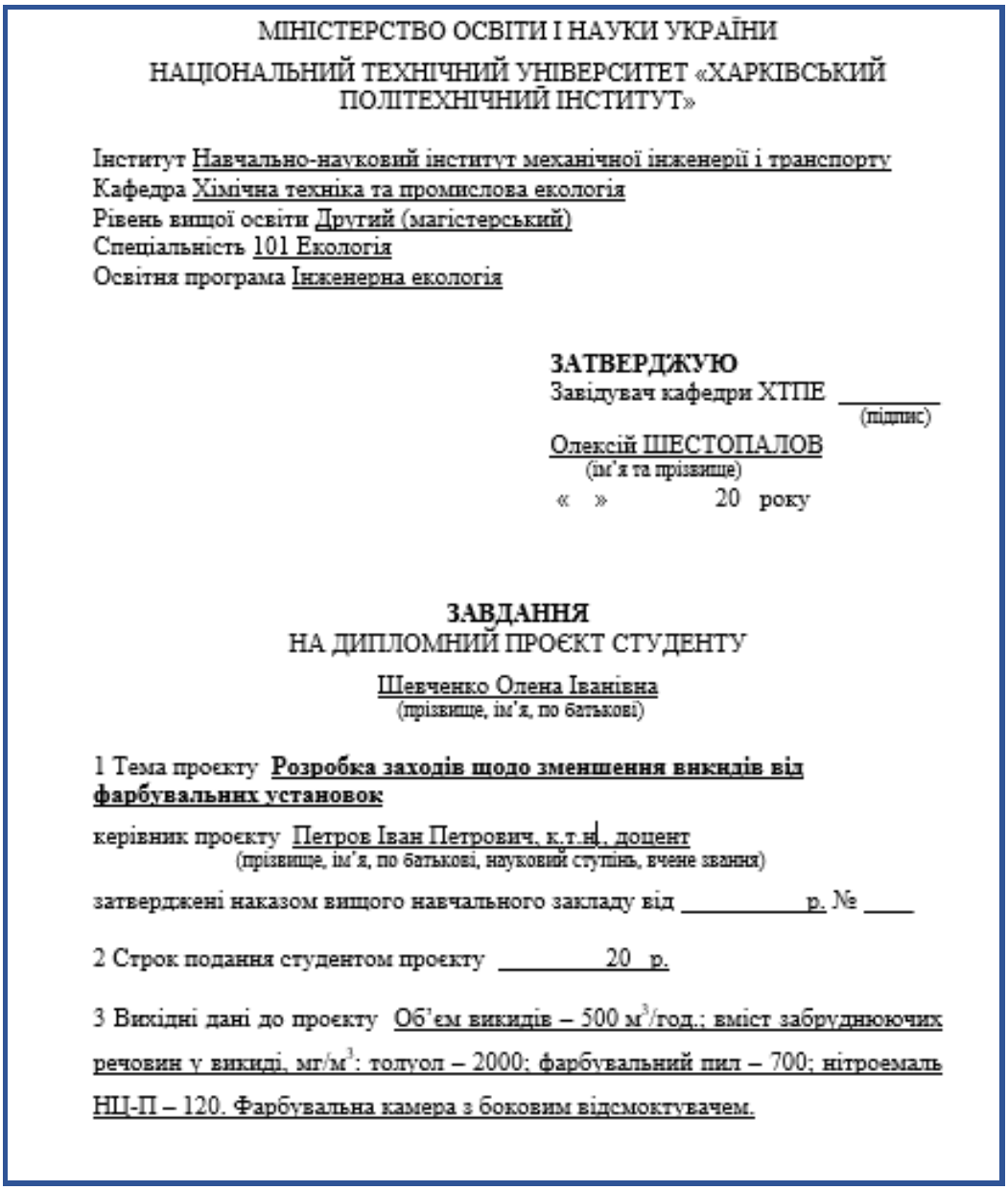
An example of documents list in Ukrainian

Назва виробу, об'єкта або теми	Назва документа	Фор-мат	Кільк. арк.	При-мітка
	Документи загальні			
	Завдання на ДП	А4	1	
	Пояснювальна записка до ДП	А4	96	
	Конструкторські документи			
Фарбувальна камера	Кресленик загального виду	А1	1	
Гідрофільтр	Складальний кресленик	А1	1	
Гідрофільтр	Специфікація	А4	2	
Форсунка	Кресленик деталі	А1	1	
Очистка газових викидів	Схема пневмогідравлічна			
	принципова	А1	1	
	Плакати			
Розташування підприємства	Карта-схема	А1	1	
Розподіл концентрацій				
забруднюючих речовин	Карта-схема	А1	1	
Склад газових викидів	Таблиця	А1		
	Ілюстративний матеріал			
Розробка заходів щодо зменшення				
викидів від фарбувальних				
установок	Презентація	А4	7	
	Наукові розробки			
Особливості конструкції	Стаття			
гідрофільтру				

				МІТ-М122.07 ВД			
	Прізвище	Підп.	Дата				
Розроб.	Шевченко О.			Розробка заходів щодо зменшення викидів від фарбувальних установок	Літ.	Аркуш	Аркушів
Перев.	Петров І.				Д П М		1
					НТУ «ХПІ» Кафедра ХТПЕ		
Н. контр.	Петров І.			Відомість документів			
Затв.	Шестопалов В.						

APPENDIX C

Task for diploma project in Ukrainian



МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ «ХАРКІВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ»

Інститут Навчально-науковий інститут механічної інженерії і транспорту
Кафедра Хімічна техніка та промислова екологія
Рівень вищої освіти Другий (магістерський)
Спеціальність 101 Екологія
Освітня програма Інженерна екологія

ЗАТВЕРДЖУЮ
Завідувач кафедри ХТПЕ _____
(підпис)
Олексій ШЕСТОПАЛОВ
(ім'я та прізвище)
« » 20 року

ЗАВДАННЯ
НА ДИПЛОМНИЙ ПРОЄКТ СТУДЕНТУ

Шевченко Олена Іванівна
(прізвище, ім'я, по батькові)

1 Тема проєкту **Розробка заходів щодо зменшення викидів від фарбувальних установок**

керівник проєкту Петров Іван Петрович, к.т.н., доцент
(прізвище, ім'я, по батькові, науковий ступінь, вчене звання)

затверджені наказом вищого навчального закладу від _____р. № ____

2 Строк подання студентом проєкту _____20 р.

3 Вихідні дані до проєкту Об'єм викидів – 500 м^3/год.; вміст забруднюючих речовин у викиді, мг/м^3: толуол – 2000; фарбувальний пил – 700; нітроемаль НЦ-П – 120. Фарбувальна камера з боковим відсмоктувачем.

Figure C. 1 – Front side of task page

4 Зміст розрахунково-пояснювальної записки (перелік питань, які потрібно розробити): Огляд літератури. Фізико-географічна і кліматична характеристика району. Розробка технології очистки газових викидів. Опис і розрахунок основного обладнання. Оцінка впливу об'єкта на навколишнє середовище. Техніко-економічне обґрунтування природоохоронних заходів. Охорона праці і навколишнього середовища. Цивільний захист. Висновки.

5 Перелік графічного матеріалу (з точним зазначенням обов'язкових креслень): Кресленик загального виду фарбувальної камери. Складальний кресленик гідрофільтра. Кресленик форсунки. Схема очистки газових викидів. Карти-схеми розташування підприємства та розподілу концентрацій забруднюючих речовин. Склад газових викидів та кошторис витрат на НДР (таблиці).

6 Консультанти розділів проєкту

Розділ	Прізвище, ініціали та посада консультанта	Підпис, дата	
		завдання видав	завдання прийняв
Економічна частина			
Охорона праці та навколишнього середовища			
Цивільний захист			

7 Дата видачі завдання _____ 20__ р.

КАЛЕНДАРНИЙ ПЛАН

№ етапу	Назва етапів дипломного проєкту	Строк виконання етапів проєкту	Примітки
1	Отримання завдання та збір матеріалу		
2	Огляд літератури		
3	Розробка технології очистки газових викидів		
4	Вибір та розрахунок основного обладнання		
5	Виконання креслення схеми пневмогідравлічної		
6	Виконання креслень основного обладнання		
7	Проведення техніко-економічних розрахунків		
8	Розробка заходів щодо охорони праці		
9	Виконання плакатів і таблиць		
10	Оформлення пояснювальної записки		
11	Отримання рецензії та захист		

Студент _____ (підпис) Шевченко О.І. (прізвище та ініціали)

Керівник проєкту _____ (підпис) Петров І.П. (прізвище та ініціали)

Figure C. 1 – Back side of task page

Appendix D

Explanation note for diploma project in Ukrainian

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ «ХАРКІВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ»

Інститут Навчально-науковий інститут механічної інженерії і транспорту
Кафедра Хімічна техніка та промислова екологія
Спеціальність 101 Екологія
Освітня програма Інженерна екологія

ПОЯСНЮВАЛЬНА ЗАПИСКА
до дипломного проєкту
другого (магістерського) рівня вищої освіти

на тему **Розробка заходів щодо зменшення викидів від фарбувальних установок**

Виконав студент 6 курсу, групи МІТ- М122

_____ Шевченко О.І.
(підпис, прізвище та ініціали)

Керівник _____ Петров І.П.
(підпис, прізвище та ініціали)

Рецензент _____ Сідоров П.П.
(підпис, прізвище та ініціали)

Нормоконтроль _____ Петров І.П.
(підпис, прізвище та ініціали)

Харків 2024

Appendix E

Title page for diploma paper in English

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL TECHNICAL UNIVERSITY
"KHARKIV POLYTECHNIC INSTITUTE"

Institute Educational and Scientific Institute of Mechanical Engineering and Transport
Department "Chemical engineering and Environmental Protection "
Specialty 101 Ecology
Educational program Engineering ecology

Allowed for defense
Head of the department
Oleksii SHESTOPALOV
(name and surname)

_____ _____
(sign, data)

DIPLOMA PAPER
second (master's) level of higher education

Diploma topic **Environmental impact assessment from painting shop**

Diploma code MIT-M122.07
(group, topic's number according to the order)

Student John Smith
(name, surname)

Diploma consultant docent Petrov Petro Ivanovich
(position, name, surname)

Kharkiv, 2024

APPENDIX F

Example of APA style for references

Articles

References to periodical articles must include the following elements: author(s), date of publication, article title, journal title, volume number, issue number (if applicable), and page numbers.

Journal article, one author, accessed online

Ku, G. (2008). Learning to de-escalate: The effects of regret in escalation of commitment. Organizational Behavior and Human Decision Processes, 105(2), 221-232. doi:10.1016/j.obhdp.2007.08.002

Journal article, two authors, accessed online

Sanchez, D., & King-Toler, E. (2007). Addressing disparities consultation and outreach strategies for university settings. Consulting Psychology Journal: Practice and Research, 59(4), 286-295. doi:10.1037/1065- 9293.59.4.286

Journal article, more than two authors, accessed online

Van Vugt, M., Hogan, R., & Kaiser, R. B. (2008). Leadership, followership, and evolution: Some lessons from the past. American Psychologist, 63(3), 182-196. doi:10.1037/0003-066X.63.3.182

Article from an Internet-only journal

Hirtle, P. B. (2008, July-August). Copyright renewal, copyright restoration, and the difficulty of determining copyright status. D-Lib Magazine, 14(7/8). doi:10.1045/july2008-hirtle

Journal article from a subscription database (no DOI)

Colvin, G. (2008, July 21). Information worth billions. Fortune, 158(2), 73-79. Retrieved from Business Source Complete, EBSCO. Retrieved from http://search.ebscohost.com

Magazine article, in print

Kluger, J. (2008, January 28). Why we love. Time, 171(4), 54-60.

Newspaper article, no author, in print

As prices surge, Thailand pitches OPEC-style rice cartel. (2008, May 5). The

Wall Street Journal, p. A9.

Newspaper article, multiple authors, discontinuous pages, in print

Delaney, K. J., Karnitschnig, M., & Guth, R. A. (2008, May 5). Microsoft ends pursuit of Yahoo, reassesses its online options. The Wall Street Journal, pp. A1, A12.

Books

References to an entire book must include the following elements: author(s) or editor(s), date of publication, title, place of publication, and the name of the publisher.

No Author or editor, in print

Merriam-Webster's collegiate dictionary (11th ed.). (2003). Springfield, MA: Merriam- Webster.

One author, in print

Kidder, T. (1981). The soul of a new machine. Boston, MA: Little, Brown & Company.

Two authors, in print

Frank, R. H., & Bernanke, B. (2007). Principles of macro-economics (3rd ed.). Boston, MA: McGraw-Hill/Irwin.

Corporate author, author as publisher, accessed online

Australian Bureau of Statistics. (2000). Tasmanian year book 2000 (No. 1301.6). Canberra, Australian Capital Territory: Author. Retrieved from http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/CA2568710006989... $ File/13016_2000.pdf

Edited book

Gibbs, J. T., & Huang, L. N. (Eds.). (2001). Children of color: Psychological interventions with culturally diverse youth. San Francisco, CA: Jossey-Bass.

Dissertations

References for dissertations should include the following elements: author, date of publication, title, and institution (if you accessed the manuscript copy from the

university collections). If there is a UMI number or a database accession number, include it at the end of the citation.

Dissertation, accessed online

Young, R. F. (2007). Crossing boundaries in urban ecology: Pathways to sustainable cities (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 327681)

Essays or chapters in edited books

References to an essay or chapter in an edited book must include the following elements: essay or chapter authors, date of publication, essay or chapter title, book editor(s), book title, essay or chapter page numbers, place of publication, and the name of the publisher.

One author

Labajo, J. (2003). Body and voice: The construction of gender in flamenco. In T. Magrini (Ed.), Music and gender: perspectives from the Mediterranean (pp. 67-86). Chicago, IL: University of Chicago Press.

Two editors

Hammond, K. R., & Adelman, L. (1986). Science, values, and human judgment. In H. R. Arkes & K. R. Hammond (Eds.), Judgement and decision making: An interdisciplinary reader (pp. 127-143). Cambridge, England: Cambridge University Press.

Encyclopedias or dictionaries and entries in an encyclopedia

References for encyclopedias must include the following elements: author(s) or editor(s), date of publication, title, place of publication, and the name of the publisher. For sources accessed online, include the retrieval date as the entry may be edited over time.

Encyclopedia set or dictionary

Sadie, S., & Tyrrell, J. (Eds.). (2002). The new Grove dictionary of music and musicians (2nd ed., Vols. 1-29). New York, NY: Grove.

Article from an online encyclopedia

Containerization. (2008). In Encyclopædia Britannica. Retrieved May 6, 2008, from http://search.eb.com

Encyclopedia article

Kinni, T. B. (2004). Disney, Walt (1901-1966): Founder of the Walt Disney Company. In Encyclopedia of Leadership (Vol. 1, pp. 345-349). Thousand Oaks, CA: Sage Publications.

Research reports and papers

References to a report must include the following elements: author(s), date of publication, title, place of publication, and name of publisher. If the issuing organization assigned a number (e.g., report number, contract number, or monograph number) to the report, give that number in parentheses immediately after the title. If it was accessed online, include the URL.

Government report, accessed online

U.S. Department of Health and Human Services. (2005). Medicaid drug price comparisons: Average manufacturer price to published prices (OIG publication No. OEI-05-05- 00240). Washington, DC: Author. Retrieved from http://www.oig.hhs.gov/oei/reports/oei-05-05-00240.pdf

Government reports, GPO publisher, accessed online

Congressional Budget Office. (2008). Effects of gasoline prices on driving behavior and vehicle markets: A CBO study (CBO Publication No. 2883). Washington, DC: U.S. Government Printing Office. Retrieved from http://www.cbo.gov/ftpdocs/88xx/doc8893/01-14-GasolinePrices.pdf

Technical and/or research reports, accessed online

Deming, D., & Dynarski, S. (2008). The lengthening of childhood (NBER Working Paper 14124). Cambridge, MA: National Bureau of Economic Research. Retrieved July 21, 2008, from http://www.nber.org/papers/w14124

Document available on university program or department site

Victor, N. M. (2008). Gazprom: Gas giant under strain. Retrieved from Stanford University, Program on Energy and Sustainable Development Web

site: http://pesd.stanford.edu/publications/gazprom_gas_giant_under_strain/

Professional Web site

National Renewable Energy Laboratory. (2008). Biofuels. Retrieved May 6, 2008, from http://www.nrel.gov/learning/re_biofuels.html

Data set from a database

Bloomberg L.P. (2008). Return on capital for Hewitt Packard 12/31/90 to 09/30/08. Retrieved Dec. 3, 2008, from Bloomberg database.

Central Statistics Office of the Republic of Botswana. (2008). Gross domestic product per capita 06/01/1994 to 06/01/2008 [statistics]. Available from CEIC Data database.

Entire Web site

When citing an entire Web site (and not a specific document on that site), no Reference List entry is required if the address for the site is cited in the text of your paper.

Witchcraft In Europe and America is a site that presents the full text of many essential works in the literature of witchcraft and demonology (http://www.witchcraft.psmedia.com/).

APPENDIX G

Example of table in diploma project

Table D.1 – Dynamic of tiger’s population in India

Number of tigers in year	Wild nature		National parks	
	Male	Female	Male	Female
2000	120	130	45	40
2010	110	100	130	110
2020	98	111	150	200

APPENDIX H

Title slides of presentation

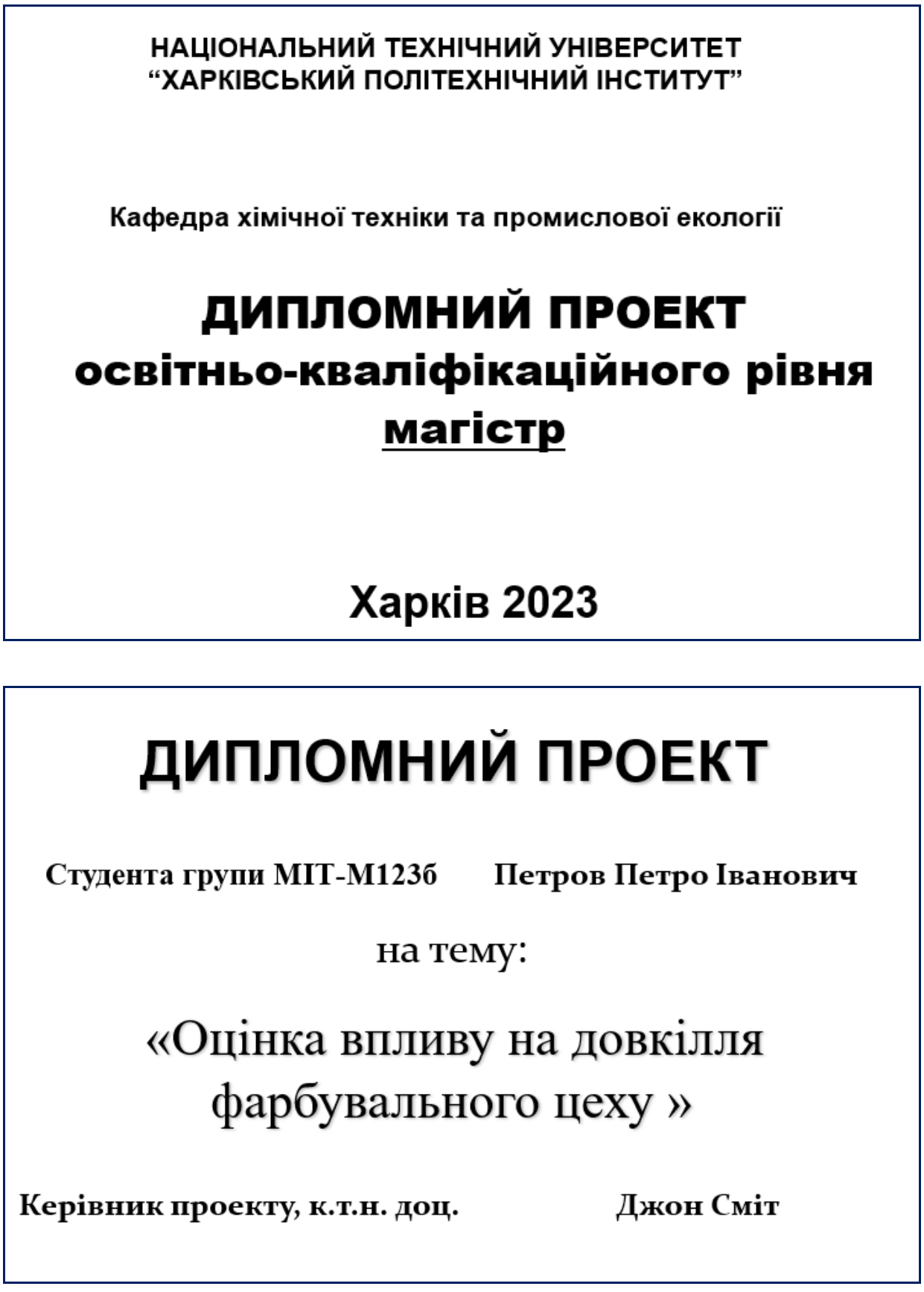


Figure H.1 – Title slides of presentation in Ukrainian

NATIONAL TECHNICAL UNIVERSITY
"KHARKIV POLYTECHNIC INSTITUTE“

Department of Chemical engineering and Environmental Protection

DIPLOMA PAPER

educational and qualification level master

Kharkiv 2024

DIPLOMA PAPER

Student of group MIT-M123б Petrov Petro Ivanovich

topic

“Environmental impact assessment from painting shop”

Diploma consultant, PhD, docent John Smith

Figure H.2 – Title slides of presentation in English

Навчальне видання

Методичні вказівки
до виконання дипломного проєкту другого (магістерського) рівня для іноземних студентів спеціальності 101 «Екологія»
(англійською мовою)

Укладачі:
ШЕСТОПАЛОВ Олексій Валерійович
НОВОЖИЛОВА Тетяна Борисівна
ТИХОМИРОВА Тетяна Сергіївна
НЕЧИПОРЕНКО Дмитро Ігорович

Відповідальний за випуск (завідувач кафедри) Шестопалов О.В.
Роботу рекомендував до друку (експерт РВР) Самойленко Н.М.
В авторській редакції

План 2024 р., поз. 621

Підп. до друку (дата підпису проректора)_____.
Гарнітура Times New Roman.

Видавничий центр НТУ «ХПІ».
Свідоцтво про державну реєстрацію ДК № 5478 від 21.08.2017 р.
61002, Харків, вул. Кирпичова, 2

Електронне видання