



# MASTERS THESIS MANUAL

FOR ENERGY STUDENTS  
2023-2024 academic year

- KEY ELEMENTS
- DESIGN
- TEMPLATES DEADLINES
- RECOMMENDATIONS

**CREATE  
MEANINGS**

**This manual is for students studying in one of the International Master of Science (MSc) programs at the Institute of Energy Peter the Great St. Petersburg Polytechnic University.**

Dear students,

The aim of this manual is to give you direction in your work, set standards for the content, design and assessment of your master thesis. Independent, individual research in the academic field of your master programme is a challenging task. We encourage you to start on time and follow the deadlines.

Your master thesis (hereafter MT) should present entire research process leading to the master thesis, from formulating problems, setting the task, choosing methods, carrying out scientific research to describing findings, conclusions and recommendations.

MT should be written in a clear and logical manner. The wording should be concise, clear and specific, the argumentation - convincing. You should keep in mind your target audience and make the text clear and understandable for them.

MT and MT internship courses together count for 22 ECTS and form an integral part of all MSc programs.

Do not hesitate to contact us if you have any questions.

Best wishes,  
Ekaterina Sokolova  
Yaroslav Vladimirov  
Natalia Dönmez

## How many pages?

The number of pages for MT may vary from 70 to 120 pages, **excluding** summary, literature list and appendices. The master thesis should be written in good English.

MT should have the following elements:

- Title page
- Task
- Abstract
- Contents
- Introduction
- Main part
- Conclusion
- List of references
- Appendix

## Title page

Title page is standard. You only add the theme of your work, you name, supervisor's name and academic titles in the relevant spaces. They are highlighted in yellow. All other information is given. You can download template for your major here:

[https://iets.spbstu.ru/en/pravila\\_oformleniya\\_kvalifikacionnyh\\_rabot/](https://iets.spbstu.ru/en/pravila_oformleniya_kvalifikacionnyh_rabot/)

Ministry of Education and Science of the Russian Federation  
Peter the Great St. Petersburg Polytechnic University  
Institute of Energy

Admitted for thesis defense  
"Heat Power Engineering and Thermal  
Engineering" Program Manager  
A.V.Ivshin

01.06.2023

### MASTER'S THESIS

**NUMERICAL INVESTIGATION OF THE CENTRIFUGAL COMPRESSOR**

**IMPELLER FOR A COMBINED CYCLE POWER PLANT**

13.04.01 Heat Power Engineering and Thermal Engineering

Carried out  
by student gr. 3241301/1p301

Sumame Intitials

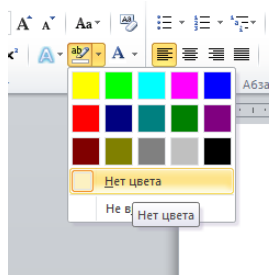
Supervisor  
Professor, Ph.D.

Sumame Intitials

Consultant  
on normative control

Vladimirov Y.A.

Saint-Petersburg  
2023



Delete the **yellow** highlighting after adding your data.

Choose no colour and move the brush over the text.

The content reflects the structure of the work. **It** includes the title of all chapters (sections), paragraphs (subsections), subparagraphs (points), indicating their page numbers.

Place it on a separate page.

Number chapters (sections), paragraphs (subsection) and subparagraphs (items) in Arabic numerals and give titles reflecting the content.

Put a dot after the digit (for example, 3.5.) and write the heading.

Don't put dot at the end of a heading.

Don't number Introduction, Conclusion, List of references and Appendices.

Examples:

<b>CONTENTS</b>	
INTRODUCTION.....	10
1. THEORETICAL BACKGROUND.....	18
1.1. Gas Turbines.....	18
1.1.1. Compressor.....	20
1.1.2. Combustion Chamber.....	21
1.1.3. Turbine.....	22
1.1.4. Brayton Cycle.....	23
1.2. Steam Turbines and Rankine Cycles.....	25
1.3. Combined Cycle.....	26
1.3.1. Waste Heat Recovery System (WHRS).....	28
5. RESULTS.....	60
5.1. Steam Turbine Inlet Temperature.....	60
5.2. Condenser Pressure.....	63
5.3. Ambient Temperature.....	65
5.4. Relative Internal Efficiency of Steam Turbine.....	67
5.5. Temperature Difference in Economizer.....	69
5.6. Temperature Difference in Evaporator.....	72
5.7. Temperature Difference in Superheater Section.....	74
5.8. Temperature Drop in Pipeline between WHRS and ST.....	77
5.9. The Parameters of the Combined Cycle's Steam Circuit Based on The Results of Investigation.....	78
CONCLUSION.....	81
REFERENCES.....	81
APPENDIX.....	86

You can add ACKNOWLEDGMENTS, List of abbreviations, List of figures, List of tables – but they are not obligatory.

## Introduction

Purpose of the introduction:

- to justify your choice of the theme,
- to explain the current state of the problem,
- to prove its relevance, practical and theoretical significance,
- to reflect the degree of development of this problem in your country and abroad.

Introduction is maximum 4 pages.

### **Possible introduction ideas in alphabetic order:**

1. approbation of the results of the research;
2. degree of scientific elaboration of the problem;
3. hypothesis of the research,
4. information base;
5. object and subject of the study;
6. practical significance;
7. purpose of the study;
8. relevance of the study;
9. research methods;
10. scientific novelty;
11. structure and amount of work.
12. theoretical and methodological basis of the research

## Main part

Main part consists of your research and applied chapters, outlining course and results of your research, followed by conclusions.

Each chapter (section) must correspond to the overall goal of the work and the corresponding task defined in the introduction. There should be a **clear and logical** connection between the chapters (sections).

### **Literature review**

The scientific literature review should form the theoretical and practical foundations of the work. The review analyzes the explanatory theories and research results in the subject area, identifying strengths and weaknesses of the theory, issues that have not been investigated or remain debatable. The review should contain: - description and analysis of the theories/concepts by means of which the investigated problem can be considered and explained (theoretical grounds of the work), - analysis of the results of modern research, based on which conclusions are drawn about the study of the problem area (practical grounds of the work), in the review only those studies whose results were published in recognized scientific journals not earlier than 6 years before the time of the thesis defense are considered.

### **Research Methodology**

This section should describe the context and conditions, in which the study is conducted, justify the choice of methodological approach to the study, describe ways of representation of the object under study, methods and research tools, and confirm their validity and reliability. In the section it is necessary to convincingly justify the choice of the approach and methods of research, which will allow obtaining answers to the research questions.

### **Results of the study**

Results of the study must be described in the section in accordance with the research questions. The text of the section should present tables and graphs with data confirming the obtained results, and an analysis of the quality of the results obtained (to what extent they can be trusted) should be made. However, meaningful conclusions should be presented in the next section "Conclusions and Discussion".

### **Conclusions and discussion**

This section formulates answers to the research questions using the results obtained and the patterns identified, confirmed or disproved. Each of the answers to the research questions should be consistently analyzed for consistency with those theoretical

justifications articulated in the literature review and in the introduction. Next, the section should make a critical analysis to establish the similarities and differences between the results obtained and previous basic and applied research. Particular attention in the section should be paid to the analysis of the limitations of this study, applied opportunities and scientific perspectives. The conclusion should not contain new information, which were not previously considered in the MT.



## Appendix

Appendix is arranged in the order references appear in the text. Each appendix starts with a new page; in the upper right corner write the word "appendix " with the appropriate serial number. Each appendix must have a meaningful thematic title. The scope of applications is unlimited and is not included in the total volume of MT pages.

*The material of the appendix should have authorship information.*

## DESIGN

**A4 format** paper

One-sided printing

font type **Times New Roman**

font size **14**,

1.5 intervals

**Margins:**

left - **30** mm, right - **10** mm, top and bottom - **20** mm.

Text is aligned **to the width** of the page.

**Page numbering** - at the **top** of the page to the **right** at a level of **10** mm from the edge of the sheet with Arabic numerals.



## IMPORTANT

Introduction, main part, conclusion, the list of used sources, appendix begin with a new page.

The "Task" file is printed on one page and is not numbered.

Do not number Abstract page but count it.

"Title Page", "Task", "Abstract" and "Content" are not included into the "Content". Since the title page has the numbering 1, the task is 2, the abstract is 3, the page with the Content is numbered 4.

## ABSTRACT

Key words/phrases are listed in capital letters, separated by commas, (from 5 to 15 words in the nominative case).

Abstract mandatory components are :

**Reason for writing:** What is the importance of the research? Why would a reader be interested in the larger work?

**Problem:** What problem does this work attempt to solve? What is the scope of the project? What is the main argument/thesis/claim?

**Methodology:** An abstract of a scientific work may include specific models or approaches used in the larger study. Other abstracts may describe the types of evidence used in the research.

**Results:** Again, an abstract of a scientific work may include specific data that indicates the results of the project. Other abstracts may discuss the findings in a more general way.

**Implications:** What changes should be implemented as a result of the findings of the work? How does this work add to the body of knowledge on the topic?

**Maximum number of words is 200.**

### Example of abstract design

#### ABSTRACT

85 pages, 50 figures, 22 tables

KEYWORDS: SIEMENS SGT-100, OPTIMIZATION OF COMBINED CYCLE POWER PLANTS, GAS TURBINES (GT), STEAM TURBINES (ST), WASTE HEAT RECOVERY SYSTEMS (WHRS)

This study aims to construct an efficient scheme by implementing Siemens SGT-100 gas turbine into combined cycle comprised of a waste heat recovery system, a steam turbine, a condenser and a pump. We investigate SGT-100 using GTP software with gas turbine parameters 1200 K of turbine inlet temperature, pressure ratio of 16:1, resulting in 30.6% efficiency. We repeated calculations in an iterative way to obtain parameters of the whole system. The following parameters were preferable: steam turbine inlet temperature 515 °C, steam turbine inlet pressure 5 MPa, condenser pressure 0.11 MPa, temperature difference of 10 °C, 15 °C, 30 °C for economizer, evaporator, and superheater sections, respectively, ambient temperature of 25 °C, temperature drop in pipelines between waste heat recovery system and steam turbine 3 °C. This work can be developed further by designing a specialized waste heat recovery unit for the system and deploying Organic Rankine Cycle.

## References

The list of sources is an obligatory part of the MT. It includes all literary sources and Internet resources used in the work. **The list of sources used is made in alphabetical order.**

The list of sources used is numbered and could be arranged in two possible ways:

1. The first line is from the paragraph, the next lines is from the border of the left margin.

Example:

A.N. Chumikov, M.P. Bocharov, S.A. Samoilenko Advertising and public relations: professional competence: a training manual. - Moscow: Publishing House "Delo" RANKHIGS, 2016. - - 520 p.

2. The first line is from the border of the left margin, the next lines are from the paragraph.

*Example:*

A.N. Chumikov, M.P. Bocharov, S.A. Samoilenko Advertising and public relations: professional competence: a training manual. - Moscow: Publishing House "Delo" RANKHIGS, 2016. - - 520 p.

### **Bibliographic information:**

#### **Book**

title (surname, initials of the author);

the title (the name of the source);

information related to the title (textbook, manual, manual, dictionary, etc.);

information on editors, compilers, translators, etc.;

Information on the publication (revised, supplemented, etc.);

Place of publication (city where this source is published);

publishing house;

the year of publishing;

volume (number of pages).

#### **Magazine**

Surname, initials of the author;

article title;

the name of the magazine (newspaper);  
the year of publication of the magazine (newspaper);  
number of the magazine (date of issue of the newspaper);  
the pages on which the article is located.

**Electronic resource:**

Surname, initials of the author;  
article title;  
the general designation of the material (electronic resource) - if the list of sources used consists of different types of sources;  
the name of the portal;  
Website address;  
date of reference.  
Hyperlinks in the list of used sources should be removed.

## APPENDICES

Each appendix starts from a new page and must be reflected in the Content.

## Tables, graphics, formulas

The tables are placed after the first mention so that it is convenient to read them without turning the work or turning clockwise. The table has a numbering header (for example, Table 3.1), which is drawn at the right margin.

*Example:*

Table 1.1

Thematic title			
Heading	Heading		Heading
	subheading	subheading	
Row header			

If the table does not fit one page and needs to be transferred to another , then a numbering scale is made under the head of the table, which is then duplicated on the following pages after the words "Continuation of Table 1.1" or "End of Table 1.1." If there is one table in the work, then when it is transferred, the word "Continuation" or "End" is written.

Continuation table.1.1

1	2	3	4
Row header			

## Formulas

The equation or formula is selected in a separate line, if there is an explanation. Explanations are placed directly under the formula in the same sequence as they are given in the formula. The value of each character is drawn from a new line. After the formula, put a comma, and the first line of explanation begins with the word "where" without a colon.

For example:

$$S = a \cdot b,$$

where S – area of a rectangle in m<sup>2</sup>;

a and b – the lengths of the sides of the rectangle in m.

If there is a reference to the formula in the text, then it is numbered in Arabic numerals in parentheses at the level of the formula at the right margin.

For example:

$$S = a \cdot b, \tag{2.4}$$

(the fourth formula of the second section).

In the text, the reference is indicated as follows: "... in the formula (2.4)" or "... in (2.4)".

## Figures

Figures are numbered within the section, For example: Fig.2.3 (the third figure of the second section). If the work contains only one drawing, then it is not numbered. For each figure there should be a link in the text, For example "... is shown in Fig. 2.3" or "... we will compose a substitution scheme (Fig. 2.5)". When the link to the same illustration is repeated, the word "look", For example: (see Fig. 2.3) is abbreviated.

Make drawings using a computer.

Figures can be located in the text of the document after the first reference to them or placed on separate sheets so that it is convenient to consider them without turning the page or turning it clockwise.

It is recommended to place the drawings on separate pages, they are taken into account in the general numbering. Figures should have a number and a name and can have explanatory inscriptions.

From the text to the top of the picture and from the bottom of the picture to the caption, 2 intervals (1 cm) recede. The figure inscription is made by size 12 in the centered way within the width of the picture (if it is more than one line, then the lines are written through a single interval). From the caption to the next text leave two intervals.

The characteristic points of the diagrams are allowed to be marked graphically, for example, by circles, crosses, etc. The notation of the points should be explained in the explanatory part of the diagram.



## PLAGIARISM

The thesis must consist exclusively of your original work. When you cite, build on or use research or data provided by others, reference this in accordance with recognized reference styles. Inadequate referencing will be considered plagiarism.

Please note that program coordinators scan all theses for plagiarism 14 days prior to master's thesis defense. Every case of plagiarism shall be reported to the Examination Board. Minimum required originality is 75%.

If originality is less than 75 % student has 3 days to make necessary changes. If originality is still below 75% the thesis could get "unsatisfactory" grade.

Master thesis evaluation criteria in the alphabetic order:

- clear bibliography and scientific reference material;
- competent master thesis defense;
- conformity of the content with the theme, aims and tasks;
- independent thinking and creativity
- logic and clarity of the text
- master thesis presentation skills
- practical importance of your research
- relevance and scientific novelty
- research depth
- validity of conclusions and proposals

After graduation complete the questionnaire at [sfa.spbstu.ru](http://sfa.spbstu.ru) to share your MT in SPbPU Electronic Library.

Title, name of the author and keywords will be publicly accessible at <https://elib.spbstu.ru/>.

**Детальная информация**

Название: Численное моделирование процессов в PEM-электролизере воды: выпускная квалификационная работа магистра: направление 13.04.01 «Теплоэнергетика и теплотехника»; образовательная программа 13.04.01\_03 «Тепловые электрические станции (международная образовательная программа)»

Авторы: [Ильин Роман Олегович](#)

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Организация: Санкт-Петербургский политехнический университет Петра Великого. Институт энергетики

Выходные сведения: Санкт-Петербург, 2022

Коллекция: [Выпускные квалификационные работы: Общие коллекции](#)

Тематика: [Электрики: Численные методы](#); [Возобновляемые источники энергии: Водород; альтернативный носитель энергии; alternative energy carrier](#)

УДК: 621.357.1; 544.642; 519.6; 502.174.3.502.21; 620.92

Тип документа: [Выпускная квалификационная работа магистров](#)

Тип файла: PDF

Язык: [Русский](#)

Уровень высшего образования: [Магистратура](#)

Код специальности ФГОС: [13.04.01](#)

Группа специальностей ФГОС: [130000 - Электротехника и теплотехника](#)

ОИ: [10.18720/SPbPU/5/2022/01/022-1913](#)

Права доступа: Доступ по паролю из сети Интернет (чтение, печать, копирование)

Уровень защиты: [неизвестно](#)

Разрешенные действия: -

Действие Прочитать будет доступно, если вы выполните вход в систему или будете работать с сайтом на компьютере в другой сети

Действие Загрузить будет доступно, если вы выполните вход в систему или будете работать с сайтом на компьютере в другой сети

Polytech login credentials are required to access the whole text of the thesis and to download the document.

**Детальная информация**

Название: Численное моделирование процессов в PEM-электролизере воды: выпускная квалификационная работа магистра: направление 13.04.01 «Теплоэнергетика и теплотехника»; образовательная программа 13.04.01\_03 «Тепловые электрические станции (международная образовательная программа)»

Авторы: [Ильин Роман Олегович](#)

Научный руководитель: [Китанина Екатерина Александровна](#)

Организация: Санкт-Петербургский политехнический университет Петра Великого. Институт энергетики

Выходные сведения: Санкт-Петербург, 2022

Коллекция: [Выпускные квалификационные работы: Общие коллекции](#)

Тематика: [Электрики: Численные методы](#); [Возобновляемые источники энергии: Водород; альтернативный носитель энергии; alternative energy carrier](#)

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Язык: [Русский](#)

Уровень высшего образования: [Магистратура](#)

Код специальности ФГОС: [13.04.01](#)

Группа специальностей ФГОС: [130000 - Электротехника и теплотехника](#)

ОИ: [10.18720/SPbPU/5/2022/01/022-1913](#)

Права доступа: Доступ по паролю из сети Интернет (чтение, печать, копирование)

Разрешенные действия: [Прочитать](#) [Загрузить](#) (4,2 МБ)

Группы: Читатели; Авторизованные пользователи СПбПУ

Сеть: Интернет



**It is important to have your work published in the Electronic library for diploma legalization and applying for PhD.**

### Steps before master thesis defense:

1. Have MT approved by your supervisor.
2. Get supervisors feedback.
3. Get external review and get ready to answer the questions listed in it.
4. Send you MT to program coordinator for originality check 10-12 days prior master's thesis defense.
5. Upload your MT to [sfa.spbstu.ru](http://sfa.spbstu.ru) 10 days prior to master's thesis defense.

### Program coordinators:

Yaroslav Vladimirov

Examination Board secretary

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tel.+ 7 950 024 69 54

Office: SPbPU, Higher School of Nuclear and Heat Power Engineering,  
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Natalia Donmez

International students' coordinator,

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tel. +7 921 776 05 95

Office: SPbPU Main building, office 313

## FORMAL PROCEDURE OF MASTERS THESIS DEFENCE

1.1 The MT is defended to the State examination board (SEB). The defense is a formal based on the protocol approved by the members of SEB.

1.2 The members of SEB and the procedure of its work are defined in the Regulation on State Final Assessment of Higher Education Programs - Bachelor's, Specialist's and Master's Degree Programs.

1.3 SEB meeting takes place in a meeting room with multimedia equipment.

1.4 A student presents a work in the form of an oral presentation using presentation material prepared in PowerPoint or other presentation program. Provide each member of the SEB with printed presentation materials.

The duration of the presentation for Master's degree is not more than 10 minutes.

1.5 After the presentation the student answers the questions of SEB members. Then supervisor gives her feedback on the work and its author. In the absence of the supervisor, the feedback and the review are read by the SEB secretary. After this, the student is given a final word to explain remarks noted in the report and the review.

1.6 Decisions of the state examination commissions are made at closed meetings of SEB by a simple majority of votes of the members participating in the meeting, with the obligatory presence of the chair or deputy chair of the commission. If the number of votes is equal, the chairperson of the SEB (in the absence of the chairperson, the deputy chairperson) has a casting vote. The number of members present from the total number of SEB must be not less than 2/3.

1.7 SEB announces the results of defense on the same day after signing up the minutes of the meeting. After the defense, the MT defense protocols are stored in the university archive.

1.8 The final grade for the MT is given by SEB according to the results of the master's thesis defense. Grades given by the supervisor and reviewer (if any), as well as originality check results, are taken into consideration.

1.9 The final grade for the MT is set on a scale of "excellent", "good", "satisfactory" or "unsatisfactory".

1.10. Assessment is recorded in the minutes of the SEB meeting. In case of unsatisfactory evaluation of the thesis, as well as in case of the author's failure to come to the defense for a valid reason (confirmed by documents), it is possible to assign an additional term of defense.

1.11. Students who did not pass due to non-appearance for a valid reason (temporary disability, performance of public or state duties, summons to court, transportation problems (flight cancellation, lack of tickets), weather conditions, natural disasters, family circumstances: birth of a child, death of a close relative, have the right to pass it within 6 months after MT defense.

## Graduation check out form

Diploma and transcript are usually ready within 10-14 working days. These official documents are in Russian.

To receive the documents get graduation check out form from office 206 IMOP and visit library, visa office, dormitory administration and other offices listed in the form.

Your coordinator will inform you about the graduation ceremony.

## Legalization

Legalization of a Russian diploma is necessary if you are going to continue your studies or get a job in another country (not in Russia).

Legalization procedure is carried out only in the country where the document was issued and/or prepared.

There are two types of legalization: apostille and consular legalization:

- Apostille is required in the member countries of the 1961 Hague Conference.
- Consular legalization is used for all other countries.
- Documents issued in countries that are party to multilateral or bilateral treaties abolishing the legalization requirement are accepted without legalization.

To check whether your diploma must be legalized for use in another country, consult the information in the tables below or ask the embassy or consulate of the country where you plan to work or study.

Plan this procedure in advance.



## Consular Legalization

Apply at [Consular Department of the Ministry of Foreign Affairs of Russia in Moscow](#)

<https://www.kdmid.ru/consr/legalization-of-documents/>

Afghanistan	Angola	Bangladesh	Benin
Bhutan	Burkina Faso	Cambodia	Cameroon
Canada	Central African Republic	Chad	
Comoros	Congo, Democratic Republic of	Republic of Congo	Cote d'Ivoire
Djibouti	East Timor	Equatorial Guinea	Eritrea
Ethiopia	Gabon	Ghana	Guinea
Guinea-Bissau	Haiti	Indonesia	Iraq
Jamaica	Jordan	Kenya	Kiribati
Kuwait	Laos	Lebanon	Libya
Madagascar	Malaysia	Maldives	Mali
Mauritania	Micronesia, Federated States of	Mozambique	Myanmar
Nauru	Nepal	Niger	Nigeria
Pakistan	Palau	Palestine	Papua New Guinea
Puerto Rico	Qatar	Rwanda	Saudi Arabia
Senegal	Sierra Leone	Singapore	Solomon Islands
Somalia	South Sudan	Sri Lanka	Sudan

Syria	Tanzania	Thailand	The Gambia
Togo	Tuvalu	Uganda	United Arab Emirates
Vatican City	Zambia	Zimbabwe	

## Apostil

Apply at [Science and Higher school committee of St. Petersburg.](#)

Andorra	Antigua and Barbuda	Australia	Austria
Bahamas	Bahrain	Barbados	Belgium
Belize	Bolivia	Botswana	Brazil
Brunei Darussalam	Burundi	Cape Verde	Chile
China, Hong Kong	China, Macau	Colombia	Costa Rica
Denmark	Dominica	Dominican Republic	Ecuador
El Salvador	Fiji	France	Germany
Grenada	Guatemala	Guyana	Honduras
Iceland	Ireland	Israel	Japan
Korea Southern	Kosovo	Lesotho	Liberia
Liechtenstein	Luxembourg	Malawi	Malta
Marshall Islands	Mauritius	Mexico	Monaco
Morocco	Namibia	Netherlands	New Zealand
Nicaragua	Norway	Oman	Panama
Paraguay	Peru	Philippines	Portugal

Saint Kitts and Nevis	Saint Lucia	Saint Vincent and the Grenadines	Samoa
San Marino	Sao Tome and Principe	Seychelles	South Africa
Suriname	Swaziland	Sweden	Switzerland
Tonga	Trinidad and Tobago	Turkey	United Kingdom
United States	Uruguay	Vanuatu	Venezuela

### Legalization not required

Abkhazia	Albania	Algeria	Argentina
Armenia	Azerbaijan	Belarus	Bosnia and Herzegovina
Bulgaria	Croatia	Cuba	Cyprus
Czech Republic	Egypt	Estonia	Finland
Georgia	Greece	Hungary	India
Iran	Italy	Kazakhstan	Korea North
Kyrgyzstan	Latvia	Lithuania	Macedonia
Moldova	Mongolia	Montenegro	Poland
Romania	Serbia	Slovakia	Slovenia
South Ossetia	Spain	Tajikistan	Transnistria
Tunisia	Turkmenistan	Ukraine	Uzbekistan
Vietnam	Yemen	China	

## IMPORTANT DATES AND DEADLINES

<b>Power Plant Engineering</b>	
Proposal and task	no later than February 10,2023
Final thesis submission	no later than June 1, 2023
Feedback and external review	two weeks prior to master thesis
Plagiarism check	no later than June 10, 2023
Uploading master thesis defense documents	no later than June 09 ,2023
Master thesis defense	June 18-21, 2023
<b>Electrical Power Engineering</b>	
Proposal and task	no later than February 10,2023
Final thesis submission	no later than May 28, 2023
Feedback and external review	two weeks prior to master thesis defense
Plagiarism check	no later than June 1, 2023
Uploading master thesis defense documents	no later than June 03 ,2023
Master thesis defense	June 10, 2023
<b>Nuclear Power Engineering</b>	
Proposal and task	no later than February 10,2023
Final thesis submission	no later than June 1, 2023
Feedback and external review	two weeks prior to master thesis
Plagiarism check	defense no later than June 10, 2023
Uploading master thesis defense documents	no later than June 09, 2023
Master thesis defense	June 18-21, 2023

*\*Dates can slightly change.*

**Peter the Great St. Petersburg Polytechnic University**  
**Institute of Energy**

Approved by

"Heat Power Engineering  
and Thermal Engineering"  
Program Manager

A.V.Ivshin

01.06.2024

**TASK**

**For the implementation of master's thesis**

student \_\_\_\_\_  
full name , group number

1. Master's thesis theme: \_\_\_\_\_

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2. Master's thesis completion date:

3. Initial data of work:

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4. Contents of the work (list of issues to be developed): \_\_\_\_\_

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5. List of graphic material (with mandatory drawings): \_\_\_\_\_

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6. Consultants (if any): \_\_\_\_\_

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7. Assignment issue date \_\_\_\_\_  
(date)

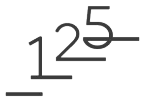
Master's thesis work assignment supervisor \_\_\_\_\_  
(signature) surname, initials

The assignment was accepted for execution \_\_\_\_\_  
(date)

Student \_\_\_\_\_  
(signature) surname, initials

## Supervisor's feedback

1. Supervisor's feedback is reflecting professional qualities of the graduate and the quality of the work done .
2. Supervisor's feedback, as a rule, should not exceed 1 typewritten page.



## FEEDBACK

for the master thesis

" \_\_\_\_\_ "

(theme of the master thesis – it should match the theme in the task)

performed by student group № \_\_\_\_\_

of Peter the Great St. Petersburg Polytechnic University

\_\_\_\_\_  
(full name)

Master thesis by ( Surname and initials of the student) on the theme “ ” meets/does not meet basic requirements for the qualification work of the university specialty (code and name are indicated ) \_\_\_\_\_

" \_\_\_\_\_ " and can be recommended/cannot be recommended for master thesis defense.

I evaluate the work of (Surname and initials of the student) as excellent /good/satisfactory. If the graduation work is successfully defended, the student can be awarded master's qualification.

Master thesis  
supervisor: title,  
academic degree

signature

Name Surname



The reviewer gives feedback only on the master thesis. Text should be 2 - 3 typewritten pages long. It could be printed on the official letterhead of the organization.

Review usually covers the following aspects:

1. Relevance of work
2. Overall assessment of the Thesis (with reviewing its strengths and weaknesses)
3. Comments
4. Questions
5. Conclusion

REVIEW  
for the master thesis

" \_\_\_\_\_ "

*(title of the master thesis in strict accordance with the task)*

performed by student group № \_\_\_\_\_ of Peter the Great St. Petersburg Polytechnic  
University

\_\_\_\_\_  
*(full name)*

Master's thesis by ( surname and initials of the student) "Title of the topic in accordance with the Title page" meets (does not meet) the requirements for graduation qualification works and deserves an "excellent, good, satisfactory" mark (does not deserve a positive mark).

Reviewers title, academic degree  
Surname

signature

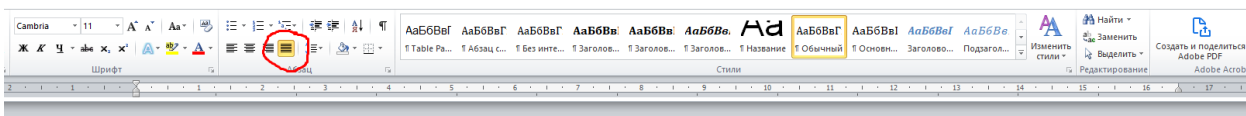
Name

Note: Certification of the signature, for example, with a seal is desirable, but not essential

\_\_\_\_\_

## How to Align the text to the width

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum



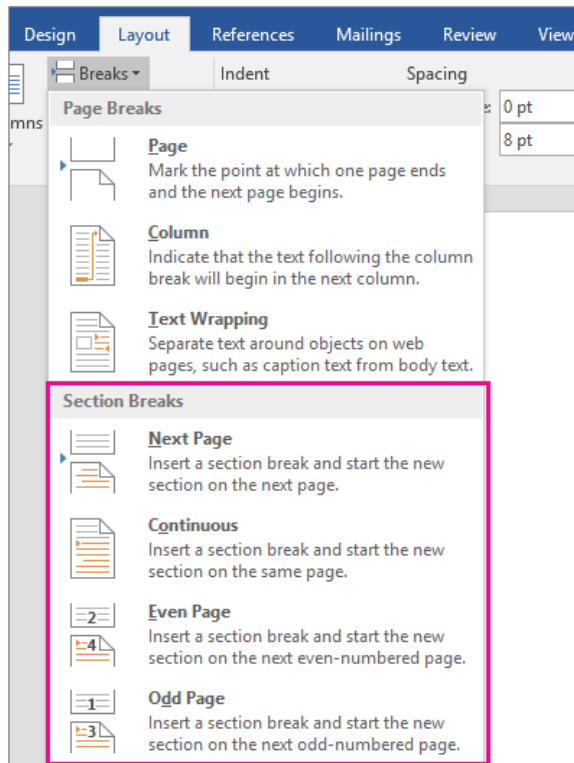
# How to

## Align text

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum

## How to Separate pages

1. Select where you want a new section to begin.
2. Go to **Layout > Breaks**.



3. Choose the type of section break you want:

Do not use “Enter” to separate pages.

**Use active verbs**

<b>Purpose</b>	<b>Verbs</b>
To show analysis	analyse, appraise, define, diagnose, explore, identify, investigate, observe
To summarize	assess, conclude, feature, highlight
To indicate control (to be stable or to maintain at a level)	constrain, control, govern, influence, inhibit, limit, maintain, prohibit, regulate, secure
To discuss findings	attest, confirm, contend, demonstrate, document, indicate, reveal
To state	comment, convey, elaborate, establish, identify, propose
To show increase	advance, development, enlarge, exceed, extend, facilitate, improve, increment, maximize
To show decrease	alleviate, cease, decline, depress, descent, deteriorate, minimize, subside, reduce
To show change	alter, accommodate, difference, evolve, fluctuate, generate, transform, transition, vary
To indicate information in a figure	depict, display, illustrate, portray, reveal
To indicate information in a table	classify, enumerate, gives, lists, presents, summarizes
To stress that a task has been performed in-depth	adequately, comprehensively, exhaustively, extensively, thoroughly
To show parts	comprises, compose of, constitutes, encompasses, includes, incorporates
To indicate negative stand	challenge, contradict, disagree, dispute, reject, question
To indicate positive stand	confirm, compliment, corroborate, substantiate, support, uphold, validate, verify

To show approximation	approximate, estimate, resemble, predict
<p><i>*Note:</i></p> <ul style="list-style-type: none"> <li>The verbs listed under each category are NOT synonyms and are different based on context. Please ensure that the selected verb conveys your intended meaning.</li> </ul> <p>Please be sure to use the American (analyze) or British (analyse) English version of the word based on your language of choice.</p>	

### Put actions in verbs

Verbs are *action words*: they describe motion, like to *explore*, to *examine*, or to *observe*.

Verbs can be turned into nouns, which changes the word from an *action* to a *thing*. A noun that is formed from a verb like this is called a *nominalization*.

Here are some examples of scientific verbs and their nominalizations:


Action	Nominalization
to regulate	regulation
to analyze	analysis
to occur	occurrence
to understand	understanding
to investigate	investigation
to delineate	delineation
to perform	performance

Scientific writing regularly disguises the main actions in nouns, costing reader energy.

Check if you overuse nominalizations and improve your writing by restructuring your sentences to capture actions in verbs.

For example:

#### Sentence

 We performed an analysis on the data

#### Action

nominalization

## Sentence

## Action

 We analyzed the data.

verb


### Keep subjects near verbs


All readers look for the answers to:

1. *who* is the sentence about? Subject
2. *what* are they doing? Verb

When subject and verb are far apart it confuses readers, because they can't put together the whole picture without answers to these questions. In science writing, this is often caused by long, complex subjects.

Example

 Hence, top **surface of the canister**, which is also in contact with the top surface of concrete, **becomes** the region with highest temperatures in the computational domain.

 Canister's upper **surface contacts** the concrete, and thus **has** the highest temperatures in the computational domain.

### Use passive voice properly

Some writers **incorrectly** think *passive voice makes the text more scientific and more objective*. Some academic writing classes still teach you this way. But the way you write doesn't make your experiments any more objective; instead, your results should speak for themselves.


Scientific journals expect you to use active voice:


Nature journals like authors to write in the active voice...-*Nature*

Choose the active voice more often than you choose the passive... -*Science*

Concise writing is better: it takes less time to read and it uses less space. Readers benefit from less reading (it takes less time). Passive voice tends to increase length. When every word counts, active voice can help keep writing concise.



Example:

 After that, total heat transfer rate has been calculated for inlet and outlet boundaries and resultant -3236.02 W has been obtained.

 Next, we calculated the total heat transfer rate for the inlet and outlet boundaries and obtained the result -3236.02 W.

## Omit needless words

Examine your writing and consider what each word adds; you may be surprised at how many are unnecessary.

Instead of	Consider
	
the question as to whether	whether
there is no doubt but that	doubtless
used for fuel purposes	used for fuel
in a careful manner	carefully
this is a subject that	this subject
a large majority of	most
has the capacity to	can
whether or not	whether
are in agreement	agree
prior to	before
subsequent to	after
at this point in time	now
due to the fact that	because
in the event that	if
a new initiative	an initiative
nearly unique	unique/rare



**Instead of****Consider**

plays a key role in

is essential to

both cultures were equally affected

the cultures were equally affected

**Prefer simple words**

Never use a complex word when a simple word will do.

**Instead of****Consider**

elucidate

show

putative

(nothing)

methodology

method

utilize

use

etiology

cause

*adapted from Duke Graduate School Scientific Writing Resource*



# ABSTRACT CHECKLIST

## HOW TO MASTER THESIS

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Abstract is a **highly condensed** form to present major elements of your work. It is a **summary** of your whole thesis.

### KEY ELEMENTS

#### 1. Reason for writing

- Why is your research important?
- What is the aim?
- Why is it relevant?

#### 2. Problem

- What problem do you solve?

#### 3. Methodology

- Direct description of what you did in one or two sentences

#### 4. Results

- Highlight only the most important findings

#### 5. Implications

- What changes should be implemented as a result of the findings of the work?
- Your suggestions for further research

### NOTA BENE

Count but do not number the page of the abstract.

Limit your abstract to 150-200 words.

Above the text of the abstract:

- List the number of pages, pictures, tables, applications
- Add 5-15 key words/phrases in capital letters, separated by commas



# PRESENTATION CHECKLIST

## HOW TO MASTER THESIS

---

**Time limit** 7-10 minutes

**Aim** - to highlight the most important points of your research

**Audience** - examination board, instructors of your departments, classmates

### KEY ELEMENTS

- **Introduction**

Why was the study done? What was the research hypothesis or the purpose of the research?

- **Methods**

When, where, and how was the study done?

- **Results**

What answer was found to the research question; what did the study find? Was the tested hypothesis true?

- **Discussion**

What might the answer imply and why does it matter? How does it fit in with what other researchers have found? What are the perspectives for future research?

**DISCOVER  
THE WORLDS**

### DO

- Keep eye contact with the audience
- Use palm cards to write down the notes of your speech
- Use template of the presentation <https://short.link/69ayfy>, make as many slides as it is necessary for you
- Illustrate your speech with slides
- Tell in a clear and logical manner
- Use pen to show info on the slides
- Breath

### DON'T

- Copy the text of your speech on the slides
- Read the text of your speech
- Worry - you are doing your best, we know it