

VILNIUS UNIVERSITY
LIFE SCIENCES CENTRE

STUDY PROGRAMMES IN GENETICS
METHODOLOGICAL GUIDELINES FOR THE PREPARATION OF THE THESIS

Approved by the Genetics Study Programmes Committee meeting held on 3 May 2022

Vilnius 2022

These guidelines apply to the students on the bachelor's and master's degree study programmes in Genetics who are preparing their bachelor's or master's theses. The guidelines are also recommended for students working on their term papers.

STRUCTURE OF THE THESIS

A sample structure of the thesis is provided in Table 1 below.

Table 1. **Structure of the thesis**

Part of a final thesis	Comments
Title page	
Table of Contents	
List of Abbreviations	(if required)
<i>Santrauka</i>	In Lithuanian
Summary	In English
Introduction	
1. Literature Review	May be subdivided into sections
2. Materials and Methods	May subdivided into sections
3. Results and Discussion	May be subdivided into sections. For Master's theses, two separate chapters are recommended: 3. Results 4. Discussion of results
Conclusions	
Description of Personal Input	
Acknowledgements	
List of References	
Appendices	(if necessary)

Title page

The title page of the thesis should specify: Vilnius University, Life Sciences Centre, the first name and surname of the student, the title of the thesis, the type of thesis (bachelor's or master's), the name of the study programme, in this case, the Genetics Study Programme, the name of the supervisor (and adviser, if any), the location, Vilnius, and the year. The title page must be formatted as per the sample provided in Appendix 1. The title of the thesis on the title page should be in bold, and 14 point font size and the rest of the text should be in 12 point *Times New Roman*. The title page must be included in the page numbering, i.e. it should be included in the overall numbering of the pages in the thesis, but the number must not be visible.

The Table of Contents

The Table of Contents of the thesis must be formatted as per the sample provided in Appendix 2. The titles of the main chapters of the thesis must be indicated, with appropriate numbering and listed in the Table of Contents, but only up to and including any third level of subdivision. The smallest subdivision that should be included in the Table of Contents consist of three digits.

List of Abbreviations

It is recommended that abbreviations be employed conservatively, and only used for the terms where the direct reintroduction of them in the text would make reading difficult (e.g. names of chemical compounds, programmes, formulae, or similar names that are frequently used in the text). If a term or a name is used only once or a few times, it should not be abbreviated. If a term or a name is used frequently, it should appear in full at first mention in the text and the abbreviation to be used thereafter should be indicated in parenthesis. In this case, it is also obligatory to make a List of Abbreviations. The list should include all abbreviations typed out in full that might be unfamiliar to the reader. If the abbreviation is made up of English words, the English words must be typed out in full. Gene names are not abbreviations and may not be included in the List of Abbreviations. Abbreviations that are widely used (e.g. CNS, PCR, names of amino acids and chemical elements, DNA, RNA, bp, kDa, kg, mg, etc.) should not be included in the list. The Lithuanian names for rarer compounds should be checked in dictionaries (most dictionaries are easily available online). It is recommended to begin compiling the List of Abbreviations at the start of writing a thesis.

Summaries

Summaries in Lithuanian (Appendix 3) and in English (Appendix 4) must be no longer than one page (up to 4,000 characters, including spaces). Summaries in English and Lithuanian should include the title and the author, a brief but comprehensive presentation, the main conclusions and the significance of the thesis. The summary should reflect the relevance of the topic, the aims and objectives of the research, the research methodology, the main findings, and the main conclusions and suggestions. The summary in Lithuanian and English must be identical, i.e. the English version must not contain statements that are not present in the Lithuanian version and *vice versa*.

Introduction

The Introduction is a very important part of the thesis, as it sets the stage for the entire thesis. It is advisable to write the Introduction last, after the entire thesis has been completed and can be seen in its entirety. The Introduction should be no longer than two pages, and provide a concise presentation of the essence of the thesis, briefly supporting the relevance and originality of the research topic. It may include hypotheses of the project, the methods used and so on. The

Introduction should conclude with a statement of the aims and objectives of the research. Usually, it starts with more general points and moves on to more specific ones, discussing what is already known and what remains to be researched.

The aim of the thesis should reflect the essence of the whole research and define the end result to be achieved. The aim must be defined in one sentence, be consistent with the title of the topic and reflect the chosen subject. The following verbs should be used to express the aim of the thesis: *to research, to examine, to identify, to support, to analyse, to define, to reveal, to anticipate, to prepare, to compose, to create*, etc. The following verbs should be avoided: *to describe, to find out* (this can be achieved in a few minutes), *to clarify* (individual study goal), *to discover, to obtain* (one-time action with an element of randomness), or *to prove* (a term specific to mathematics).

An example of the aim of the thesis might be: *To evaluate the potential genotoxicity of silver and aluminium oxide nanoparticles in human peripheral blood lymphocytes in vitro.*

While the aim of the thesis describes the main question that the research seeks to answer, the **objectives of the thesis** describe the intermediate questions that, if unanswered, will not lead to the achievement of the main aim of the thesis. The objectives elaborate on the aim of the thesis and cover the main aspects to be addressed in the thesis and, consequently, the main components of the research work. The aim and objectives of the thesis should not only focus on the achievement of a specific objective, but also on its outcome. When formulating the objectives, the following verbs should be used: *to compare, to investigate, to determine*, etc. The objectives of the thesis should be numbered and each should be given in a new line. The conclusions should be consistent with the objectives: these two parts of the thesis are closely linked. At the end of the thesis, at least one conclusion corresponding to each of the objectives should be provided.

Examples of the objectives:

1. *To investigate the effect of silver and aluminium nanoparticles on the viability and nuclear division rate of human peripheral blood lymphocytes.*
2. *To determine the potential genotoxicity of silver and aluminium nanoparticles by the comet assay.*
3. *To investigate the effect of nanoparticle exposure time on the amount of induced primary DNA damages.*

Literature Review

The theoretical part of the thesis is a systematic review of scientific articles, academic publications and theoretical support of the issues raised by the author relevant to the topic of the thesis. The theoretical and practical parts of the thesis should be closely linked. The theoretical part of the thesis is the foundation for the practical part. The Literature Review should account for 1/4 to 1/3 of the thesis. It is advisable to review the most recent literature (over the past five years). Any

subdivision of the Literature Review into sections should be clear and justified. The Literature Review is greatly enhanced by a figure or a diagram, but any such illustrations should provide a general overview.

Materials and Methods

This section should provide a coherent and clear description of the methodologies used, the research process, information about sampling sites (if your research includes fieldwork), etc. The description of the methodology should be composed so that it can be understood and replicated by anyone who reads it.

The description of the methodology must specify:

- The subjects (if the research involves the use of human subjects) – who took part in the research, what criteria were used to select them (age group, physical characteristics, exclusion criteria, etc.), and
- The objects of the research (if it was carried out on animals, plants, fungi or other living or non-living natural objects) – describe the species analysed, the criteria used to select the objects, etc.

Important: For studies that include animal studies, the number of the permit issued by the Lithuanian Ethics Committee for the Use of Experimental Animals under the State Food and Veterinary Service must be specified. For human studies, the number and the date of issue of the permit from the Bioethics Committee under the Ministry of Health to conduct the study must be specified.

- Materials – describe what materials were used and who manufactured them.
- Methods used – a concise description of all stages of the research, a step-by-step flowchart of the experiment, and an explanation of the essential procedures. The protocol of the research should not be transcribed verbatim, but summarised. It is also not necessary to describe in detail the routine procedures, e.g. the production of buffers, etc. (but it should be stated which solutions, and at what concentrations, were prepared and used).

In the methodology section, it is important to include and specify the equipment used, the methods of measurement and analysis, including statistical analysis and all other information relevant to the research. The instruments used and their manufacturers must also be indicated. If standard manufacturer's kits have been used for some part or stage of the research, it is sufficient to state that the manufacturer's recommendations have been observed (and specify where information on these recommendations is available). If quantitative data is obtained during the research, the chapter on Statistical Methods should indicate the number of replicated experiments, what statistical

indices were reported, and which tests were used to compare the data. The computer software used to analyse the data must also be indicated.

Specific parts of the methodology which take a lot of space (questionnaires, specialised sets of stimuli, figures or similar sets, etc.), should be provided in Appendices.

It is important to mention any collaborations with other institutions and colleagues, if certain experiments have been carried out together with colleagues and not individually by the student.

Example: The scanning electron microscopy (SEM) analysis of the obtained silver nanoparticles was carried out at the National Centre for Physical Sciences and Technology in collaboration with Dr J. Everyman.

Results

This section details the results of the author's research. It starts with a few sentences describing the research that has been conducted. It should state the aim of the experiment and what the author hoped to be find out. It is helpful to state whether the work has started a new line of research or whether it is a continuation of work carried out in the laboratory. The main objectives of the thesis should also be specified. This will be a reiteration from the Introduction, but the experiments carried out rather than the topic of the thesis will be the focus. Subsequently, the results of the experiments must be described. The results should be presented in an order that helps the reader understand the logic and flow of the whole research. It is important to describe the actual results that were obtained (not those that were perhaps expected). When describing the experiments, do not repeat information that has already been provided in the methods section. This section should present the results obtained in a coherent, concise and clear manner: figures, tables, graphs, etc. The statistical reliability of the results should be demonstrated (where appropriate). Each figure or table appearing in the text must be described. The text, figures or tables must be connected, i.e. a table or a figure should be called out in the text before it appears on the page.

It is not appropriate to present several tables or illustrations in succession if they do not contain a single sentence of commentary in-between. If several illustrations must be presented without an additional commentary, they should be presented as a single figure (as separate parts of a single figure, e.g. A, B, etc.). If a table is split over two or more pages, the caption should be repeated on the next page, indicating that it is a "continuation of the table".

When presenting the results, it is important that the information in the figures and tables does not repeat, and that the text does not repeat verbatim what is presented in the figures and tables, but rather acts as a highlighter.

If there is a significant amount of results data, it is recommended to select and present only the main results that are most relevant. Other information may be included in the appendices.

Discussion

This section requires the author to provide their interpretation of the data described in the results section. It is recommended to start with a few introductory sentences that would remind the main aim of the research. This should be followed by a discussion of the significance of the results obtained, what they show, and a comparison of the results with those of similar studies by other researchers. If the results can be interpreted in several different ways, all of them should be discussed and the author should indicate which alternative, in their opinion, is more valid. All results should be discussed, even if they are unexpected or negative. For example, if bands were observed in the gels that should not be present, this should be discussed. If the experiment failed, an attempt should be made to explain what went wrong and how such problems could be avoided in the future if the research will be repeated. All the data presented in the results section should be covered in the discussion section.

A good thesis has a thorough discussion of the results, but should not repeat information provided in the results section. If the discussion is divided into sub-sections, an overall summary of the whole thesis (all parts) should be made at the end. It is also recommended that any problems encountered during the research and their solutions be included in the discussion section.

A thesis could possibly have a joint section, “**Results and discussion**”. However this is not recommended for master’s theses. In this case, the results can be discussed immediately after describing them (according to the requirements for the discussion section above), but a summary of the thesis should be provided at the end of the section.

Conclusions

Conclusions provide a concise answer to the objectives set out in the Introduction. The conclusions should not repeat the summaries of the other sections of the thesis. Based on the entire thesis, the key statements of the thesis must be provided, which are direct answers to the aim and the formulated objectives. These should be brief, specific and clear statements, without further elaboration. It is not recommended to present the conclusions as a summary of the main (discussion) part of the thesis. Conclusions should directly reflect the objectives of the work and the results obtained, and state what new knowledge and understanding has been gained from the research, rather than repeating the facts already described in the results.

Description of Personal Input

This section should describe the author’s personal input in the research that was described in the thesis. This should include his/her personal contribution to the formulation of the research idea,

the planning and execution of the research, the analysis of the results and the formulation of conclusions. If other individuals (including the supervisor) have contributed to these activities, they should be mentioned in the Acknowledgements section. CRreDit statements (<https://credit.niso.org/>) could be used for description of personal contribution to the research output.

Acknowledgements

If the thesis is part of a project supported by a funding organisation, etc., these should be mentioned in this section of the thesis.

Example: The final thesis was partly financed by the European Social Fund under measure No 09.3.3-LMT-K-712 “Development of scientific competences of scientists, other researchers, and students through practical research activities”, within the implementation of project No XX.

This section of the thesis should also list and thank all the people who have contributed to the thesis.

List of References

The List of References includes all sources of information cited in the thesis. The sources of information are those sources that the author has read and directly quoted or referred to in the thesis. If a student has read a source of information but has not cited it, it should not be included in the List of References.

The List of References must be prepared according to the citation style guidelines of the American Psychological Association, 7th edition (<https://apastyle.apa.org/style-grammar-guidelines>).

Appendices

Appendices may contain valuable supporting material that complements the thesis (e.g. sequencing data, detailed data tables and figures, illustrations that are relevant to the thesis but have not been included in the individual parts of the thesis, copies of various permits). Appendices is not a compulsory part of the thesis, but if it exists, referral to appendices must be provided in the thesis, e.g. (*see Appendix 1*). Figures and tables in each appendix must be numbered separately.

LANGUAGE QUALITY AND FORMATTING THE THESIS

Language

The thesis must be produced correctly and appropriately in the Lithuanian or English languages (where English is allowed). The language of the thesis must be clear, coherent, and

correct, and must reflect the author's ability to use scientific language and to move logically from one issue to another. The thesis must be free of grammatical, proofreading, style and other errors. It must also comply with the methodological record keeping rules and the requirements for bibliographical references and their listing in academic papers.

If there is specific terminology in the thesis, it must be discussed. If the definitions do not have a generally accepted equivalent in the Lithuanian language or in published academic papers, it is necessary to specify the term in the original language in the parenthesis in the text.

You can also check the correctness of the Lithuanian language using various online resources:

<http://www.vlkk.lt/nuorodos/zodynai>

<http://terminai.vlkk.lt/>

<http://www.vlkk.lt/konsultacijos>

<http://www.vlkk.lt/aktualiausios-temos/rasyba>

https://ec.europa.eu/info/sites/default/files/about_the_european_commission/what_the_european_commission_does/documents/interinstitutional_translation_guide_lt.pdf

Formatting and printing

An electronic version of the thesis in PDF format must be submitted for final evaluation to the supervisor, reviewer and/or the Thesis Defence Committee.

When writing your thesis, you must follow the general computer typesetting rules of the Lithuanian or English (if written in English) languages. For example, when typing a research paper on a computer, it is important to remember that:

- In the Lithuanian language, a decimal separator (that separates a whole number and its decimal part) is a comma, and in English – a decimal point.
- There is always a non-breaking space between the number and the abbreviated unit of measurement, e.g. 2.68 kg, –4 °C. The non-breaking space looks like a standard space, except at the line split it helps to keep the number and the unit of measure together.
- The abbreviated units of measurement must never appear without numbers.
- The abbreviated units of measurement must be given in a regular (upright) typeface, not in italics, regardless of the font used in the rest of the text.
- The abbreviated forms of values and their indices must be shown in italics, regardless of the font used in the rest of the text, e.g. *I_λ*. An exception is made if the same letter represents more than one value: in this case, the physical value must be typed in italics, and the other value must be typed in a regular typeface.
- The multiplication sign is a dot (·) or a cross (×) raised above the base of the line, but not the letter x of the Latin alphabet.

- The digits provided by the calculator or computer must be rounded to a satisfactory accuracy.

Some typesetting rules are provided in Appendix 5. The Table of Contents, Introduction, main sections, Summary, List of References and Appendices all start on a new page. The text of the thesis must be of high quality. The text should be typed on an A4 (210 x 297 mm) page, *Times New Roman* font 12 point, with 1.5 line spacing. The margins: top and bottom 2 cm, left – 2.5 cm, right – 1.5 cm (or left – 3 cm and right – 1 cm). The entire text alignment – left (except the title page). It is easier to read the text that is not aligned on the right, because of the uniform spacing between words. The first paragraph of each part of the thesis should be indented 1 cm from the left-hand edge of the page. Individual words within the text may be highlighted, appear in bold or underlined, but the text should not contain too many differently emphasised words.

Numbering

Pages in the thesis must be numbered continuously, starting with the title page (no page number appears on the title page) and ending with the appendices. The numbers must be written in Arabic numerals in the bottom right-hand side of the page, without any full stop or hyphens.

Only the sections and sub-sections of the main (narrative) part must be numbered: 1. Literature review, 2. Materials and methods, 3. Results, 4. Discussion. The title of each section must be shown in block capitals or in bold, and the sub-sections are usually separated by a single space. No separators/marks are used at the end of the section and sub-section titles.

If the thesis contains appendices, the page numbering remains continuous. If there is more than one appendix, it is advisable to start the Appendices section on a separate sheet headed as APPENDICES. All appendices are subsequently arranged consecutively in numerical order (the numbers are indicated in the top right corner of the page (Appendix 1, Appendix 2, etc.); appendices must have titles.

Tables and figures

Tables and figures must be numbered in Arabic numerals. Tables have titles (captions), with no full stop at the end. The title must make the tables or figures comprehensible even if they are used separately from the text. The title can be followed, if necessary, by an explanatory note (“the legend”) that can contain all the information necessary for a precise understanding and interpretation of the information provided in the table or figure. The axes of any graphs must clearly specify the units of measurement, and all rows and columns of any tables must have a heading. Each track must be labelled in the photographs of the gels and the legend must indicate what is in that track. Tables and figures shall be inserted in the text after the paragraph in which they are

referred to (e.g. “**Table 1.1.**” or “**Figure 1.1.**”). The numbering of tables and figures should be section-based (tables in Section 1 – 1.1, 1.2 ...+, tables in Section 2 – 2.1, 2.2, and so on.).

If a table or figure appears in the Literature Review and is taken from the texts of other authors, the source must be indicated. If a table or figure that appears in the theoretical part of the thesis has been prepared by the student on the basis of data from other authors, reference must be made to the literature or sources on the basis of which the tables or illustrations have been made.

When submitting a photograph (in any part of the thesis) that has not been taken by the author, the photograph must be credited or a link to its source must be provided.

The numbering and titles of any tables should appear above the tables (any source reference must be indicated either above or below the table). The numbering and titles of any figures must be provided below the figures (with any notes and source references following after the title). All tables and figures must be centred. The title or caption must be formatted using sentence case, aligned to the left margin, but the text of the table title and legend or figure caption, should not extend on the right beyond the table or figure. If there is only one table or figure in the text, it should still be numbered. The numbers in the columns of the tables should be vertically aligned so that the groups of numbers in the whole column are exactly one underneath each other. In tables, it is not recommended to use column headings showing a “sequence number” or “unit of measurement”. Units of measurement should be indicated in parenthesis next to the column headings. Use single line spacing for tables, their titles and accompanying legends.

The illustrations (charts, graphs, diagrams, photographs and other visual material) in the thesis are referred to as “figures”. The captions of figures must be numbered followed with an abbreviation “Fig.”, e.g. “Fig 1”. If photographs of microscopic objects are provided, the scale must be specified. Arial font is recommended for the figures (names of coordinate axis names, curve labels, etc.). The font size (if the figure has been enlarged, but had to be reduced when inserted into the text) must not be less than 8-point.

In larger tables, information can be presented in a 10-point font size, and complex figures in 9–10-point font size. Tables and figures should be compact and not take up more than one page. Larger tables or figures should be presented as appendices and a reference to the appendix should be included in the text, e.g. (*see Appendix 1*).

In all cases, the information in figures and tables must be clearly readable.

The use of figures should be well considered and justified. Information contained in the tables and figures should not be duplicated, i.e. the same data should not be provided in a table and, for example, in a bar chart.

The visual material (tables and figures) can only be commented upon (discussed), and should not be retold as a replication of information available in the tables and figures. A section or a sub-

section should not begin or end with a table or figure. Tables and illustrations should be inserted in the text immediately below the place in the text where they are first mentioned. A one-line space should be left before continuing with the text.

Writing gene names

Gene names (symbols) are used as names in the text and may or may not appear in the List of Abbreviations. The first mention of a gene name in the text (starting from the Introduction) should define the full English name, e.g. *HIF1A* (hypoxia inducible factor 1 subunit alpha). No further use of the definition is required in the text, figure captions, or table legends.

Gene symbols must be shown in *italics*, and full names (definitions) must be shown in the regular text (upright). The exception is fish genes, where both the symbol and the definition must be shown in *italics*. Protein names are always shown in the regular (upright) text.

If a large number of genes are mentioned in the text, a separate list of gene names can be compiled with the full English definitions and may be provided together with the abbreviations, either as part of the List of Abbreviations or as a separate list (e.g. “Gene names used in the thesis”). Only gene symbols should be provided in the appendices and no full definition is required, even if they are mentioned in the appendix of the thesis for the first time.

When writing gene names, it is important to follow the international standards accepted for the specific biological species (<https://www.biosciencewriters.com/Guidelines-for-Formatting-Gene-and-Protein-Names.aspx>, and for human genes – <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7494048/>).

Citing literature sources in the text

Any paraphrased (not verbatim) statements, classifications, tables, figures, data, formulae, or statistics used in the thesis must be referenced using the original source. This allows the reader to identify the publications or other documents used by the author in the preparation of the thesis. All other statements, classifications, definitions, formulae, tables and figures without references are attributed to the author of the thesis. In-text citations are based on the citation style guidelines of the American Psychological Association, 7th edition (<https://apastyle.apa.org/style-grammar-guidelines/citations>). It is recommended that you read and follow these guidelines carefully. The key requirement of these guidelines is that in the case of an in-text citation, the author’s name and the year of publication in which the facts were reported must be provided in parentheses, not the number indicating the position of the source in the List of References.

A cited source in the text, should be referenced in parenthesis, using the author’s surname and the year of publication separated by a comma, as follows (Fenech, 2007). If the author’s name is

already mentioned in the sentence, it is not necessary to repeat it in parentheses, the year of publication is sufficient, e.g. “When analysing micronuclei, it is important to analyse the number of micronuclei in at least 1000 binucleated cells according to the criteria recommended by Fenech (2007)”. If the source cited in the text has two authors, both names must be specified in the parentheses, separated by an “&”, e.g. (Haider & Kang, 2015). When referring to two authors in a sentence, the conjunction “and” should be used instead of the “&”, e.g. “As Haider and Kang (2015) explain...”. If the source cited in the text has more than two authors, only the name of the first author and “et al.” (abbreviation of the Latin term *et alia* meaning “and others”), must be indicated, e.g. (Kopp et al., 2019). When referring to these authors in a sentence in the Lithuanian text, use “ir kt.”, e.g. “Kopp ir kt. (2019) nustatė, kad ...”.

If the text summarises statements from multiple sources, the reference is provided at the end of the sentence, in parenthesis, and the authors’ names must be separated by a semicolon, e.g. (Fenech, 2007; Haider & Kang, 2015; Kopp et al., 2019). In this case, the sources are arranged in chronological order rather than alphabetically, starting with the earliest publication.

It is recommended to use primary (original) sources when writing the thesis. If it is necessary to indicate that a secondary source has been cited, i.e. statements made by a particular author are referred to or quoted from another author's work, it is necessary to indicate that a secondary source has been used, e.g. “Antanavičius (2015) points ut (as cited in Chomsky, 2006) that ...”. In this case, only the secondary source is included in the List of References.

Various examples of citations are available at: <https://apastyle.apa.org/style-grammar-guidelines/references/examples>.

Compiling the list of references

The List of References and sources should only include the scientific literature and sources that the author of the thesis has referred to (read, analysed) in the course of writing the thesis and that are actually referenced in the text. Lecture notes or unpublished articles (i.e. not accepted for publication) must not be included in the list. It is not recommended to quote textbooks in the course of writing the thesis or to use online dailies (e.g. *Delfi* or similar news portals), or *Wikipedia*, unless the primary sources are provided and analysed in them. The List of References and sources should not include an online source that only refers to the main web page.

There can only be one List of References, it should be strictly arranged alphabetically, across the total using the Latin alphabet, in 12-point font, using the author’s name then initials or the editor’s name and initials (if there are many authors), or the title of a publication or source (if no author is given). No grouping is required according to the type of the source (whether it is a book or an article, etc.). Literature sources that appear in non-Latin script (Cyrillic and other characters)

should be transliterated into Latin characters (standard LST ISO 9:2002 *Information and documents. Transliteration of Cyrillic characters into Latin characters. Slavic and non-Slavic languages*). For the text in the English language, the APA 7th edition includes expanded guidelines and examples for citing works that are written in another language (see Sections 9.38 and 9.39 as well as the examples in Chapter 10). Sources by the same author(s) shall be arranged according to the year of publication, the earliest first. If several works by the same author(s) were published in the same year, include a lowercase letter after the year and list alphabetically, e.g. 1999a, 1999b, etc.

The List of References must be prepared based on the requirements of the citation style guidelines of the American Psychological Association, 7th edition (<https://apastyle.apa.org/style-grammar-guidelines/references/examples>). It must be compiled using a dedicated computer software, such as the free Zotero software (<https://www.zotero.org/>) or its web application (<https://zib.org/>). Other tools may also be used: (<https://www.mendeley.com/> or <https://www.scribbr.com/apa-citation-generator/>). For explanations on how to use Zotero or Mendeley, see: <http://www.biofizika.gf.vu.lt/files/doc/pdf/bibliografijos-tvarkymas-v2-3.pdf>.

The List of References must be unnumbered, with the first line of the source aligned to the left margin of the page and the second and subsequent lines indented by 0.8 cm. Some software (e.g. Zotero) automatically format the reference list.

Example:

- Andrijauskaite, K., Morris, J., & Wargovich, M. J. (2019). Natural anticancer agents: Modifying the epigenome to prevent and treat cancer. In A. Bishayee & D. Bhatia (Eds.), *Epigenetics of Cancer Prevention* (Vol. 8, pp. 49–73). Academic Press. <https://doi.org/10.1016/B978-0-12-812494-9.00003-2>
- Butkuvienė, J., Sinkevičienė, Z., Naugžemys, D., Žvingila, D., Skridaila, A., & Bobrov, A. A. (2020). Genetic diversity of aquatic *Ranunculus* (*Batrachium*, Ranunculaceae) in one river basin caused by hybridization. *Plants*, 9(11), 1455. <https://doi.org/10.3390/plants9111455>
- Convention for the protection of human rights and fundamental freedoms as amended by protocol no. 11*. (1950, November 4). <https://polis.osce.org/convention-protection-human-rights-and-fundamental-freedoms-amended-protocol-no11>
- Lietuvos Respublikos aplinkos apsaugos įstatymas*. (1992, January 21). <https://www.e-tar.lt/portal/lt/legalAct/TAR.E2780B68DE62/asr>
- Machado, H., & Granja, R. (2020). *Forensic genetics in the governance of crime*. Springer Singapore. <https://doi.org/10.1007/978-981-15-2429-5>
- Slapšytė, G., Jankauskienė, A., Mierauskienė, J., & Lazutka, J. R. (2001). Cytogenetic analysis of children under long-term antibacterial therapy with nitroheterocyclic compound furagin.

Mutation Research/Genetic Toxicology and Environmental Mutagenesis, 491(1–2), 25–30.

[https://doi.org/10.1016/S1383-5718\(01\)00131-0](https://doi.org/10.1016/S1383-5718(01)00131-0)

Slapšytė, G., Jankauskienė, A., Mierauskienė, J., & Lazutka, J. R. (2002). Cytogenetic analysis of peripheral blood lymphocytes of children treated with nitrofurantoin for recurrent urinary tract infection. *Mutagenesis*, 17(1), 31–35. <https://doi.org/10.1093/mutage/17.1.31>

Specialty pain management center. (n.d.). Retrieved April 29, 2022, from <https://cancer-pain.org/>

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THESIS PRESENTATION AND DEFENCE

The final thesis is defended at a meeting of the Thesis Defence Committee. During the defence, the student makes a scientific presentation about the results of his/her research. The presentation requires a set of computer slides for illustration. There are two components of a scientific presentation: the visual presentation and the speech. These parts should complement each other but not duplicate each other.

When giving a scientific presentation, it is not necessary to read the text on the slides, but to speak loudly, clearly and without rushing. A microphone can be used if necessary. It is recommended to vary the intonation during the presentation and to speak in a lively, non-monotone manner. It is essential to face the audience. It is also advisable to prepare the content of the speech in advance and to rehearse the presentation, either alone, with peers or in the presence of the supervisor of the thesis.

Presentations need to take into account general patterns in terms of how people best remember information, what information to include in the slides, how it should be presented, etc. The scope of the presentation depends on the time available for the presentation (up to 10 minutes for bachelor's theses, up to 12 minutes for master's theses). The first slide should specify the title of the thesis, the author and supervisor of the thesis, and the place where the thesis was prepared (institute, laboratory). The subsequent slides should present the research problem, the aim and objectives of the research, the proposed method of solving the problem (the research methods used), the results of the research and their discussion, conclusions, and acknowledgements. It is recommended to refer back to the slide where the conclusions are formulated at the end of the presentation.

The slides of the presentation should be numbered and each needs a title. The title should explain the content of the slide, and it should contain only a few statements related to one main idea or concept. A slide with less information is always better than a slide with too much information. The text on the slides should be concise and clear, because an audience does not like to read long texts. A

general guideline is that there should be enough text for the listener to read it several times faster than the length of time the presenter shows the slide. The text should have a clear hierarchical structure, and it is recommended to use bullet points – enumerations – to reveal the components that complement the main point. Continuous, unstructured text in slides should be avoided, but if the slide contains only one statement, bullet points are irrelevant. In a list where sequence is important, it is recommended to use of numbers to itemise the list. Abbreviations may be used in the slides, but all abbreviations should be explained at the beginning of the presentation (at first mention). The text in the slides should be free of spelling and punctuation errors and the text must be aligned left. *Times New Roman* or *Arial* 28-point font or larger should be used for the slides. The recommended font size is 40-44 points for titles and 28-32 points for the body text. Capitalisation of text should be avoided. Check the suitability of the font size: if the text on the slide is easily readable within 2 metres of the computer screen, the font size is appropriate. However, if possible, it is worth checking the font size in the classroom where the thesis will be defended. The text of the slides should be easy to read from the last row.

Tables, charts and graphs are essential in the presentation. When using tables, the text should be of the clearly readable size. If a table is too large, it is recommended to split it into several parts or to show only the most important parts. It is always worth considering whether it might make more sense to present data in a graph rather than a table. Charts, graphs and other graphical objects or illustrations should support the text, i.e. a slide should contain both text and a chart or graph. When presenting a graph, it is important to remember that the names of the axes and the values of the curves or columns must be indicated. It is recommended that different curves or columns are marked in different colours. It is also recommended that both tables and graphs are prepared specifically for the presentation and not simply copied from the thesis. If the slides use material from other authors (e.g. in the description of a scientific problem), the authorship must be indicated.

The colours of the text and graphic objects must contrast with the background – white or neutral backgrounds are recommended. However, a multiplicity of colours, fonts and styles should be avoided. Choose a few colours, fonts and styles and use them consistently throughout the presentation. If MS PowerPoint presentation templates are used, it is better to simplify the templates by removing all distracting details (frames, stripes, background drawings, etc.). The fewer the stimuli on the slide, the better the retention of essential information. Animation should not be overused in scientific presentations, although it is possible to add some animation effects to slides (e.g. by drawing attention to key areas of the slide or to particularly important data).

**VILNIUS UNIVERSITY
LIFE SCIENCES CENTRE**

STUDENT'S FIRST NAME AND SURNAME IN BLOCK CAPITAL LETTERS

Title of the thesis in a 14-point bold font

Bachelor's/Master's Thesis

Genetics Study Programme

Supervisor

Academic degree, first name and surname

Consultant

Academic degree, first name and surname

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VILNIAUS UNIVERSITETAS
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Vardas Pavardė

Baigiamojo darbo pavadinimas

Bakalauro / Magistro baigiamasis darbas

SANTRAUKA

Santraukos tekstas <<...>>

VILNIUS UNIVERSITY
LIFE SCIENCES CENTRE

First name and surname

Title of the thesis

Bachelor's / Master's Thesis

SUMMARY

Text of the summary <<...>>

SOME WRITING RULES	
<i>Examples</i>	<i>Explanations</i>
-10 +15 ≤15 ±15 20±5	negative numbers appear without a space positive numbers appear without a space no space no space no space between numbers
¹³⁷ Cs	no space
10–15 kg 20 th –21 st 2:30 p.m.–5:00 p.m.	no space between numbers
0.1 cm ² /year ⁻¹	for certain dimensions, there is no space between physical measurement units and other measurement system units
$D = 0.20 \text{ cm}^2$ 1 min = 60 s	An equal sign between two items (numbers, letters or numbers and letters) with spaces
50 m, 50 kg, 50 A, 50 Pa 60°, 60', 60" 50%, 1 h = 60 min = 3600 s	space between the numeric value and the unit of measurement <i>Exception for degrees, seconds and minutes – without space between the number and the unit</i> in English language percentages are written without spaces international time units without full stops
M 1:50 000	no space between numbers in scales
80:120 mm Hg	no spaces between numbers
20×30 cm	when indicating the dimensions or size ratio of an object no spaces
+, −, ×, ·, :	mathematical symbols in formulae are shown with spaces
12.5 < S < 25... P > 0.05...	“Greater than” or “less than” symbols with spaces
1.5; 1.52 35,784; 1,548,255; 118,201,794	decimals and hundredths are separated by full stops use commas between groups of three digits in most figures of 1,000 or more
<...> 1,000 L	Omitted words/content in a quotation are indicated by three dots between “greater than” or “less than” symbols The unit of volume, litre, is denoted by capital letter L
1.602·10 ⁻¹⁹ (6.674±0.001)·10 ⁻¹¹ m ³ ·kg ⁻¹ ·s ⁻²	when a single number or unit of measurement consists of two components connected by a multiplication sign, show no spaces between them; the multiplication sign “·”, instead of “×” is used
65 °C, 135 °K	For temperatures use “°” symbol (code – alt+0176) instead of zero