

Writing the undergraduate thesis

Guidelines for students before graduation in the first cycle study programmes

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Writing and defending your undergraduate thesis is the last step of your studies. The procedure for completing your studies in the first cycle study programmes at the Faculty of Computer and Information Science is described in the *Rules on the Undergraduate Thesis in the First Cycle Programmes at the Faculty*, which are available from the Faculty website, as well as in the online classroom of the Undergraduate Thesis course. However, this document comprises a summary of the rules with some additional guidelines. Please read these guidelines before you commence with the writing of the undergraduate thesis. There you may have several questions which are not answered herein. You can obtain additional information from the Student Affairs (in case of procedural questions), your mentor (regarding content) or in the forum of the General Topics moodle course within your study programme.

1 Procedure for the application and preparation of the Undergraduate Thesis

The preparation of the undergraduate thesis begins with the selection of the mentor and the topic, it continues with the writing of the thesis under supervision of the mentor, and ends with the submission of the thesis and its defence at the Undergraduate Examination. The Successful completion of the Undergraduate Examination is considered as the formal completion of your studies, whereby you acquire all the relevant rights of a qualified engineer.

1.1 Selection of the mentor and topic

In the post-reform study programmes, the undergraduate thesis preparation is a key component of the final semester of studies. At the Undergraduate Thesis Seminar you

will receive detailed information on the undergraduate thesis preparation procedure, the available theses topics offered by potential mentors as well as thesis preparation and presentation techniques.

When selecting the mentor and undergraduate thesis topic you can also resort to the list of available thesis topics, which is available in the online classroom of the Undergraduate Thesis course. You can select a mentor depending on your area of study and make special arrangements to select a topic outside of the list of offered topics. Select a topic you like and which interests you. Work with your mentor to properly define the objectives of your undergraduate thesis and make a list of tasks which will lead you to the completion of the thesis. In agreement with your mentor, a co-mentor can participate in the preparation of your undergraduate thesis, especially when the thesis concerns an interdisciplinary topic. Upon selecting the thesis topic, a co-mentor can also be appointed by the Commission for Study Affairs upon the order of the dean.

Once you have agreed with your mentor, you can apply to submit the undergraduate thesis in the student information system. The deadline for applying is 15 April. Enter the title of the thesis and the mentor/co-mentor into the student information system.

1.2 Writing the undergraduate thesis

The deadline for completion of the undergraduate thesis is 10 months from the date of application for the undergraduate thesis topic. This deadline can be extended for another month in exceptional cases on the basis of a reasoned request. However, upon expiration of this period, you have to wait until the next academic year to apply for a new topic.

Arrange and distribute your studies and work in the last semester so you can complete your remaining study programme requirements on a regular basis and write your undergraduate thesis at the same time. The undergraduate thesis in the Computer and Information Science study programme is worth 6 ECTS credits (similar to most courses at the Faculty), which corresponds to about 150 to 180 hours of workload; or 4 ECTS credits in the Interdisciplinary study programme of Computer Science and Mathematics, which corresponds to about 100 to 120 hours of workload. Your thesis must be written individually and under the supervision of your mentor and the co-mentor (if one has been appointed).

1.3 Submission of the undergraduate thesis

The submission and defence of the undergraduate thesis is the final act of your studies. Before submitting the undergraduate thesis, you must complete all other study programme requirements.

Once you have completed all study requirements and prepared the final version of your undergraduate thesis in collaboration with your mentor, your mentor will register his approval for submission in the student information system. Before approving, he has to enter the title and the final topic text into the information system, which you then integrate in the Abstract. The thesis must be submitted in the form of an archive PDF document (meaning that the document is compliant with PDF/A - ISO19005 standard). After submission, your thesis will be automatically sent to the system for verifying plagiarism. If the thesis successfully undergoes the plagiarism verification, you will be notified via email and invited to submit a bound copy of your thesis. In the event of plagiarism, your submission will be rejected. Aggravated cases of plagiarism will be treated as a disciplinary offence.

When submitting the electronic version of the thesis paper, the student must also enter the thesis title in Slovene and English (max. 300 characters), an abstract (max. 1000 characters) and key words (max. 300 characters) into the system. The information in this file will be used for the entry in the university online archive, therefore it must be grammatically correct.

You must submit one bound copy of the undergraduate thesis, identical to the submitted electronic version, to the Student Office. One copy of the undergraduate thesis is confirmed by a stamp (on the inside of the back cover – the defence date is marked with a stamp) and signed by the Dean of the Faculty. This copy is kept in the library. At the same time you must submit a signed form (Declaration of Authorship of the undergraduate thesis) containing a declaration of authorship and the permit for publication of the thesis in electronic form.

1.4 Defence

The defence of the undergraduate thesis takes place before the Committee for Evaluation and Defence of the Undergraduate Thesis. The Committee consists of the mentor and at least two members of the Faculty teaching staff. The defence of the thesis is public, so you can invite your parents, relatives, colleagues and friends to attend.

The defence is led by the president of the Committee. It begins with a 10-minute oral presentation of the undergraduate thesis. The oral presentation must be clear, technically correct and interesting. Above all, it must be relevant in terms of content: during the presentation the Committee and the audience must get a clear image of the problem addressed by the thesis, how you resolved it and what were your (original) contributions.

The Faculty computer and projector will be at your disposal for the presentation and, if needed, you can also use additional laboratory or your own equipment upon agreement with your mentor. You can also connect the projector to your own laptop. You must arrange the use and preparation of the room, where the defence will take place, with the Student Affairs in a timely manner (at least one day before the defence). After the defence, remove your equipment immediately so that the new defence can begin and that the undergraduate thesis room is properly vacated.

Carefully prepare the presentation materials before the presentation. Presentations usually begin with the opening page containing the title of the undergraduate thesis, your name and mentor (title and name). The second page should describe the problem addressed by the thesis.

The third page should include the conceptual solution of the problem and/or objectives you defined before the undergraduate thesis. This is followed by a description of work carried out for the thesis. 10 minutes are not enough for all the details, so just describe the structure of your solution and describe one or two interesting aspects of our thesis in detail. Conclude your defence with a page briefly summarizing your achievements, or providing an original insight acquired during the preparation of the undergraduate thesis, and listing the open problems or guidelines for future development in this field.

When presenting the thesis, strictly comply with the 10-minute time limit! A shorter presentation will give the Committee the impression that you have little to say, whereas longer presentations are usually interrupted or stopped by the president of the Committee. Ten minutes restriction does not imply that you should also avoid all the technical details. At least two or three slides should be dedicated to what you did and how you did it.

The presentation is followed by questions asked by the Committee members, and relating to the broader area of your undergraduate thesis. This is followed by questions from other members of the audience (if any). Try to provide clear, brief and convincing answers. Upon your defence the Committee will

withdraw for a brief meeting to assess your undergraduate thesis and defence. During the assessment, wait in the undergraduate thesis room. Upon return the president of the Committee will declare the grade for the undergraduate thesis, the grade for defence and the final grade of the undergraduate thesis examination.

If the thesis is written in English, and the mentor agrees, the defence can be held in English as well.

2 Preparation of the undergraduate thesis

The undergraduate thesis must be printed on white A4 paper, bound and covered in cloth or other suitable material.

Any text editor may be used for the thesis. Nevertheless, we strongly recommend that you use the LaTeX environment. Learning how to use it might indeed require some effort; however, you will be rewarded with a stylistically correct and well-designed undergraduate thesis.

2.1 Laying out the undergraduate thesis in the LaTeX environment

How to use a template for typesetting the Faculty undergraduate thesis can be seen from the sample. The example illustrates how to (easily!) lay out the introductory pages, name the chapters and subchapters, insert tables and images into the text, refer to tables and images from the text, as well as cite and add references.

2.2 Other text editors

Instead of LaTeX you may choose to use other word processors. In this case, make sure the layout is correct and compliant in accordance with the requirements specified herein. Thus, the page settings should be adjusted as shown in Table 1:

Top	20mm (above the running head, if used)
Bottom	30mm
Inner	30mm
Outer	20mm

Table 1: Margins

Set the font type to Times New Roman or similar, and the title font to Arial or Helvetica. The font size should be 12 with 1.3-line spacing. Printing should be

double-sided. Chapters should start on odd pages. For the numbering of chapters use outline decimal numbering, same as the one used in these Guidelines.

2.3 Required components

The cover of the undergraduate thesis must contain

- 30mm from the upper margin: the names of the university and faculty in block letters
- in the centre of the page:
 - o name and surname of author;
 - o title of the undergraduate thesis;
 - o the label UNDERGRADUATE THESIS (also in capital letters);
 - o study programme, i.e. one of the following:
 - ACADEMIC STUDY PROGRAMME OF COMPUTER AND INFORMATION SCIENCE
 - PROFESSIONAL STUDY PROGRAMME OF COMPUTER AND INFORMATION SCIENCE
 - ACADEMIC STUDY PROGRAMME OF COMPUTER SCIENCE AND MATHEMATICS
- below (central alignment) 'Ljubljana, year'; where the year is the current calendar year (e.g. 2014). The inscription should be placed 30mm from the bottom page margin.

The cover is followed by the introductory pages, which are not numbered, in the following order:

- the title page (the first page) is identical to the cover, while the mentor is also added below the study programme and above the year;
- the Declaration on Intellectual Property of the Undergraduate thesis, which is evident from the enclosed example, or a description of used licences (text CC-licenca.pdf), if the student decides – in agreement with their mentor – to publish the undergraduate thesis under licenses, offering partial public rights (e.g. e the Creative Commons or GNU GPL);
- the text of the undergraduate thesis topic, copied from the student information system, where it was entered by the mentor;
- acknowledgments, in which the undergraduate thanks everyone who contributed to the successful completion of the undergraduate thesis in any way;

- a possible dedication;
- table of contents, which comprises numbered headings of chapters and subchapters including page numbers;
- a list of abbreviations and symbols, which must be uniform throughout the thesis, regardless of their form in the used references (if required);
- a brief summary of the thesis paper (approx. 100 words) and a list of key words in Slovene;
- a brief summary of the thesis paper and a list of key words in English.

If the undergraduate thesis is written in a foreign language, the title page (cover) of the undergraduate thesis is written in Slovenian. The pages are as follows:

- The first page of the undergraduate thesis in the foreign language,
- The first page of the undergraduate thesis in Slovenian,
- The Declaration on Intellectual Property or a description of the used licenses in the foreign language,
- the text of undergraduate thesis topic in a foreign language,
- the text of undergraduate thesis topic in Slovene,
- acknowledgment, dedications and index in the same order as in a undergraduate thesis written in Slovenian,
- a brief summary of the thesis work and a list of key words in a foreign language,
- a brief summary of the thesis work and a list of key words in Slovene,
- The abstract of the undergraduate thesis in Slovenian, which should consist of 3 to 5 pages.

From this page on, the pages are numbered with page numbers in the upper outer margin of the page.

2.4 Equations, figures, tables and other elements of the undergraduate thesis

When writing the undergraduate thesis, follow the rules for designing expert technical texts. Mathematical symbols should be written in italics, whereas physical constants, units and mathematical functions should be written in plain text. Number the displayed equations with a serial number in parentheses on the right side of the formula and thus reference them. If a professional term does not have a commonly accepted translation, list the original expression as found in the referenced literature in parentheses upon the first mention of the Slovenian term. The foreign term should be in italics.

Include visual material (graphs, scheme, illustrations, screenshots, etc.) in the undergraduate thesis to contribute to clarity and readability of the thesis. Figures must be numbered and referenced in the text, as well as equipped with suitable captions (directly below the image) to describe what the figure is showing. They should be inserted in the text at the place of their first reference and aligned to the centre together with captions.

Use tables to summarise numeric results of experiments in the undergraduate thesis. The tables should be numbered as well and equipped with captions directly below, same as figures. All tables and figures should be referenced in the text. They should be inserted in the text at the place of their first reference and aligned to the centre together with captions.

2.5 Citations

To cite bibliography use the Slovenian version of the IEEE format. Reference sources as shown in the examples below:

Bibliography

- [1] P. A. Bernstein, U. Dayal, An overview of repository technology, from the journal 20th Intl. Conference on Very Large Databases, Santiago, Chile, Sept. 1994, p. 705-713.
- [2] R. Ramakrishnan, Database Management Systems, New York: McGraw-Hill, 1998, ch. 3.
- [3] R. D. Semmel, D. P. Silberg, Extended entity-relationship model for automatic query formulation, Telematics and Informatics, no. 10, vol. 3, p. 301-317, 1993.
- [4] (2005) IEEE Information for authors. Available at:
<http://www.ieee.org/portal/cms/docs/pubs/transactions/auinfo03.pdf>

When citing sources in the text of the thesis, use the number of the source in brackets (e.g. [2] or [2, 3], when referencing two different works). Examples for other types of referencing can be obtained in the IEEE journals, available in the library or their website [4]. It is very important to cite the sources correctly (author, title of work, and where and when the work was published).

If you design the undergraduate thesis using the LaTeX environment, we recommend that you to write the Bibliography in the BibTeX format.

3 Language instructions

The undergraduate thesis is normally written in Slovenian. Based on a reasoned request, the Commission for Study Affairs can permit the candidate to write the undergraduate thesis in one of the world languages (e.g. English).

The undergraduate thesis must be linguistically flawless. We recommend that you submit your undergraduate thesis for proofreading prior to its submission. A technical/professional text is not a work of literature and is therefore subject to different rules.

- Professional texts should be unambiguous, so keep the sentences short, simple and understandable.
- Write the undergraduate thesis in an impersonal style. Use the first person plural (we developed, we prepared) or the passive voice (this was developed, this was made). Do not use the first person singular (I developed, I made) or use it only in exceptional cases where you want to emphasize your personal decision among several options.
- For each term or concept, use the same name and description (if necessary) throughout the entire undergraduate thesis.
- If introducing new terms or concepts, note that they should be clearly and precisely defined.
- Use established professional terminology.
- By writing professional texts, Slovenian professional terminology is also being developed. Where it makes sense and no translation into Slovenian exists for a technical term, find a suitable Slovenian translation in co-operation with your mentor.
- Special attention should be paid to translations from English. Mind the Slovenian grammar rules. Noun attributes are on the right side of the subject or object in Slovenian (“SQL query” is “poizvedba SQL”, “API interface” is “vmesnik API”, “x-axis” is “os x”), so be careful when translating from English. The reverse word order in Slovenian, e.g. “SQL poizvedba”, “Windows strežnik” and “ACME system” is incorrect.

4 Structure of the undergraduate thesis

The content of the undergraduate thesis should include:

- Abstract;
- Introduction;
- Body, reasonably divided in chapters;

- Conclusion;
- List of used sources (Bibliography); and
- Enclosures.

Number the chapters from Introduction to Conclusion. The list of referenced sources entitled Bibliography is not numbered as a chapter. If you write the thesis in the LaTeX environment, the numbering of the chapters will be done automatically and correct, while you have to pay special attention to numbering when using other word processors.

The abstract should not exceed one paragraph and in the impersonal grammar style (passive). The abstract should comprise from 100 to 200 words to summarise the objective of your undergraduate thesis and how you achieved it (what you designed, developed, produced).

The introduction should describe the issue addressed by your undergraduate thesis, provide the motivation for your work (why this issue needed to be addressed), and briefly, in one paragraph, how the undergraduate thesis solves this problem and what were your main contributions in this field.

Reasonably divide **the body** into several chapters. As a rule, the body begins with a chapter on methods and tools which you used in the undergraduate thesis (description of methods, procedures and tools, examples of typical use, etc.). In the next chapter describe your work and contributions. For example, describe in detail the method or system you developed, and give details on how you implemented your ideas into the developed hardware and/or software; e.g. if you developed an information or software system or one part or component thereof for your undergraduate thesis, you can specify examples of application of this system or software in the next chapter. If the system has a graphical user interface, display the screenshots of its typical application in this chapter. If the focus of your undergraduate thesis was to develop new methods, this chapter may focus on its experimental assessment and discussion of the experimental results.

The conclusion may begin with a paragraph describing the accomplishments of your undergraduate thesis and its main contributions. The next few paragraphs should describe why these contributions can be significant, what their potential application value is and what could have been improved in the undergraduate thesis in accordance with the set objectives. If the work you developed is already in use, do mention it in this chapter and also describe the responses and experience of its users.

The **Bibliography** chapter should list the referenced sources in alphabetical

order of the authors' surnames. State only those sources which are cited or referenced in the text. A long list is not a proof of a good familiarity with literature.

5 Conclusion

The undergraduate thesis is your main achievement in the first cycle study programme at the Faculty. Ensure that it is technically and grammatically correct and foremost, relevant in terms of content. You will be proud of a great undergraduate thesis for your entire life. Moreover, it will be an honour and pride of our students, as well as our professors.

Disclaimer

All effort has been made to ensure the accuracy of this translation, which is based on the Slovenian original. Translations of this kind may nevertheless be subject to a certain degree of linguistic discord; in case of doubt or misunderstanding, the Slovenian text, being the official version, shall thus prevail