

An engineer thesis in computer science, in engineering sciences, addresses a practical problem in computer technologies. A student defines a practical problem, reviews the domain literature, and available computer tools, chooses appropriate technical solution to the problem in question. Then the author designs and describes a technical solution, plans and implements the solution, summarize and draw conclusions. The elaborated solution and the precisely described process of its design, implementation, and testing confirms the student's engineering skills.

## Minimal requirements for the Engineer Thesis

### Substantive requirements

1. The thesis holds at least:
  - a. **Introduction** into the problem domain, settling of the problem in the domain, objective of the thesis, scope of the thesis, short description of chapters, clear description of contribution of the thesis's author – in case of more authors table with enumeration of contribution of authors
  - b. **Analysis of the problem**, state of the art, problem statement, literature research (all sources in the thesis have to be referenced), description of existing solutions (also scientific ones, if the problem is scientifically researched), algorithms, location of the thesis in the scientific domain
  - c. **Requirements and tools** – functional and nonfunctional requirements, use cases (UML diagrams), description of tools, methodology of design and implementation
  - d. **External specification** – hardware and software requirements, installation procedure, activation procedure, types of users, user manual, system administration, security issues, example of usage, working scenarios (with screenshots or output files)
  - e. **Internal specification** – concept of the system, system architecture, description of data structures (and databases), components, modules, libraries, resume of important classes (if used), resume of important algorithms (if used), details of implementation of selected parts, applied design patterns, UML diagrams
  - f. **Verification and validation** – testing paradigm (eg V model), test cases, testing scope (full / partial), detected and fixed bugs, results of experiments (optional)
  - g. **Conclusions and summary** – achieved results with regard to objectives of the thesis and requirements, item path of further development (eg functional extension ...), encountered difficulties and problems
2. The title of the thesis, its chapters, and sections should precisely and correctly describe the content.

3. Tables and figures should not present exactly the same information. The same information in different form is allowed in an appendix.
4. Each abbreviation should be presented in full at the first occurrence. All abbreviations and symbols should be listed and explained in an appendix.

## **Formal requirements**

1. General issues:
  - a. fulfillment of conjunction of conditions:
    - i. min. 30 pages (counted from the first page of introduction to the last page of summary)
    - ii. min. 5000 words in the body of the thesis (exclusively tables, captions, codes, and pseudocodes),
  - b. In case of a thesis with multiple authors the numbers in p. 1a have to be multiplied by the number of the authors.
  - c. The thesis should comply with the provided template.
  - d. Page, chapter, section, subsection, table, figure, and listing numbering is obligatory.
  - e. Two versions of the thesis:
    - i. final one,
    - ii. a version without figures, tables, listings, biography, table of contents, and appendices.
  - f. Declaration of the thesis supervisor on fulfillment of formal requirements.
2. Figures and tables
  - a. Each figure has a number and a caption below.
  - b. Each table has a number and a caption above.
  - c. Listings (excerpt short inlines) are treated as figures.
  - d. Each table and each figure has to be referenced at least once in the body of the thesis.
  - e. A table or a figure must not be separated from its caption (eg. by page break).
  - f. Figures, tables, chapters etc should be referenced with a number. Do not use phrases like «the figure below» or «the table above...».
  - g. All figures should be drawn by the author(s) of the thesis.
3. Language:
  - a. Use correct English – spelling, style etc.
  - b. Do not use slang or informal language!
  - c. Use precise language, adequate terms.
4. Math formulae
  - a. Use mathematical mode for all equations, formulae, even for single symbols in text.
  - b. Each formula must have a number.
5. References:
  - a. All cited parts have to be clearly marked as citation (from the beginning to the end). Sources of all cited parts have to be

referenced – otherwise it is plagiarism! All theses are tested with plagiarism detection systems!

- b. Figures taken from other publications (in well justified cases!) must be provided with the source.
  - c. The bibliography should hold at least 10 sources:
    - i. technical reports,
    - ii. books,
    - iii. specialised internet sources, or
    - iv. scientific publications
  - d. All referenced sources have to be cited in the thesis.
  - e. Bibliography items should be sorted by surnames of the first author. Each item has to be numbered. The bibliography list should be placed after the body of the thesis.
  - f. A bibliography item for a book holds: author(s), title, publisher, and year.
  - g. A bibliography item for an article holds: author(s), title, title of journal, number, volume, pages, and year.
  - h. A bibliography item for an Internet source holds: title, Internet address, and access date.
  - i. A reference list, table of contents, list of tables, list of listings are not numbered as chapters.
6. The thesis is accompanied by a CD/DVD with
- a. the text of the thesis (both pdf file and editable sources)
  - b. the source code of application(s) written for the thesis, data sets needed for reproducibility and replicability of tests.
  - c. Reviewers should be provided with all what is needed to verify the application(s).



