Template for Theses in LATEX (Arial 20pt bold)

University Of Oulu
Information Processing Science
Bachelor / Master's Thesis
First name Last name
Year

Abstract (Heading 1 Arial 18pt)

LaTeX template for University of Oulu's Information Processing Science theses. Mimicks the official word template.

Times New Roman 12pt Line spacing 1

Abstract is needed to sum the master's thesis up. The abstract is to be uploaded into Optima before the final grading of the thesis. Please find the current information about the format given in Optima.

The guide includes instructions for students. It is written keeping in mind the idea that the user may utilise it e.g. by pasting his or her text on the current text. The contents include information about formatting the text, positioning tables and figures, among other things. In addition, the use of proper literature is instructed. Even if there is no strict structure for the thesis, a recommendation is offered in this guideline.

One important guideline for the text is that do not write too short paragraphs. For instance, if there is only one sentence in a paragraph, the sentence must be really important and influential to form a paragraph of its own.

It is not possible to provide information in a guideline like this for all issues related to master's thesis. For example, the research process, ways to acquire research material and its analysis are excluded in the guideline. On the other hand, a structure for a research plan is provided in the appendices.

Keywords (Arial 12pt italic)
first keyword, second keyword, other keywords

Supervisor (Arial 12pt italic)
Title, position First name Last name

Foreword (Heading 1 Arial 18pt)

Times New Roman 12pt line spacing 1

The foreword is not instructed by the supervisors. In other words, the student may write in this section what she or he wants to share with readers. However, it is a custom to thank all those who have contributed to the research somehow. When acknowledging people, their affiliations are given (e.g. Professor, University Lecturer, Adjunct Professor, Mrs.) This guideline is based on the previous version that was written in Finnish and finalised by Dr. Lasse Harjumaa in January 2007. This version is to replace the earlier version. I want to thank all those people who have contributed to the earlier versions and this newest version, the first written in English. Hopefully this guideline will serve both students and faculty with its instructions that include both formal and informal regulations and recommendations. In the first phase, the constructive comments are received with pleasure by raija.halonen@oulu.fi. Oulu, January 10, 2011

Raija Halonen Oulu, March 10, 2020

I got this IPS template after searching in Overleaf. While comparing with the 2025 version, I found many differences, as this was last updated around 2021. I started to update it for my own writing, but later thought of sharing it with others.

Wishing everyone a productive and enjoyable thesis writing.

MD Shafiul Alam
Oulu, January 29, 2026

Declaration of Generative AI in the Thesis (Heading 1 Arial 18pt)

Times New Roman 12pt line spacing 1

In this section, you should clarify your independent contributions to the thesis and explain how AI was used in its preparation, if applicable Generative AI and AI-assisted technologies can be used in the writing process to improve the readability and language of the thesis. If you use generative AI to assist in producing the thesis, you must declare in this section which model version (e.g., ChatGPT 3, Midjourney 6) you used and how you used it (for searching information, ideating, language checking, translating, visualisation). Use of generative AI in other uses than described above, need to be discussed and agreed with the supervisor, and declared here. Note that you take full responsibility for the content of the thesis and the accuracy of all material. AI cannot be credited as the author of any text or other written work. AI cannot take responsibility for the content of the text. If you use generative AI in a thesis in other ways than declared, or the use can be considered as academic misconduct, it will be handled according to the same principles as other cases of misconduct. The same applies if you fail to report that you used generative AI.

Contents

Abbreviations

IPS Information Processing Science. 7

1 Introduction (Heading 1 Arial 18pt numbered)

This is a template for bachelor theses and master's theses in Information Processing Science IPS. This template outlines the required formatting and referencing used in theses. Every chapter starts with text. The text acts as a short introductory part for the following sections.

1.1 Title page (Heading 2 Arial 14pt numbered)

The name of the thesis is written positioned 13 cm from the upper edge of the title page by the font Arial and size 20. A potential subtitle is written by Arial size 16. On the right bottom of the page starting from 9 cm the name of the university, department, type of thesis, the author and date are written. If this template is used for exercise assignment, the student number is needed to ease crediting the performance. The student number is not included in bachelor or master's thesis.

1.2 Text and headings

The thesis is written with Times New Roman (or similar) with single line spacing. The font is 12 points. The paragraphs are written without indentation and are separated by one empty line (12 p). Except the main headings, the headings are written by small alphabets. The main heading is in Arial font size 18 and sub headings Arial font size 14. The main headings start new pages. The heading is positioned after 48 point empty space and after the heading there is 24 point empty space. The subheadings are preceded by two empty lines (24 p) between the subheading and the following text there is empty space of one line. On the left there is 4 cm margin to ease stapling. All other margins are 2 cm According to generally adopted style, there may not be consecutive headlines. Therefore introductory text is needed after headlines before following headlines. The headlines may not remain alone without the actual text on the same page. Instead, the headlines must be tied with the following paragraph.

1.3 Tables, figures and lists

Tables should be centred and the size of a table should correspond to its content. Tables must be numbered and named by a caption. The numbering is running from the beginning of the thesis. The captions are positioned above the tables. Above the caption there is space for one empty line (12 p) and below 6 points. The table must be referred according to its number. Referring to a table by "see below" or "in the next table" is not sufficient. Table 1 summarizes the font styles that are used in the theses.

Table 1: The heading styles in the theses.

	Font Style	Size	NB
Heading0	Arial	18	No Numbering
Heading1	Arial	18	
Heading2	Arial	14	
Heading3	Arial	14	
Heading4	Arial, italics	12	No Numbering, not recommended
Body Text	Times Roman	12	
Table title	Arial	10	Note the bolding
Figure title	Arial	18	Note the bolding

A table should not divide on two or more pages. Instead of a too long table it is recommended to build several smaller tables or to consider if there are more suitable formats to present the information such as appendices. If the contents of the table or the table as is are copied from another publication it must be cited properly. See the referencing guide.

Pictures must be numbered and named by a title. The numbering is running from the beginning of the thesis. The title is placed below the picture. Below the title is an empty space of one line (12 p). Above the picture is an empty space of 6 p. The picture is referred by its number in the text. If the picture is narrower as the body text, it is centred (see Fig. 1).

A good hint to insert a picture is to add a table (Table – Insert – Table - 1 column, 1 row, Autofit to contents) first, and then paste the picture into the cell. Thus the picture does not float over the text and margins when editing the document. Remember to remove the table borders. Always keep the titles near the tables and pictures.
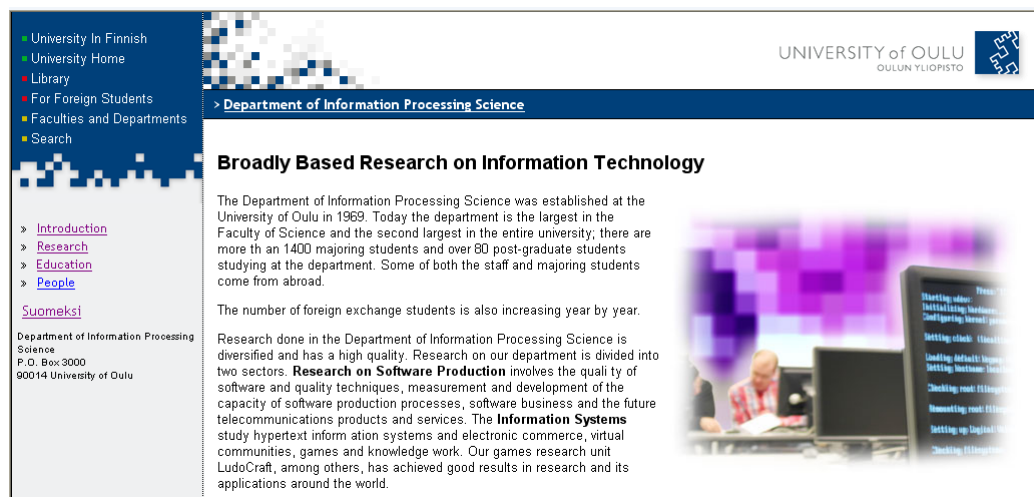

Figure 1: Example of a screen caption. In case of a long title it is indented by 1.7 cm from the left margin.

According to Finnish Laws, pictures are under legal protection. They must not be copied without permission. There are exceptions such as pictures that consist of statistical information or are produced only from numerical data. If the picture (diagram, photo, screenshot, etc.) is a direct copy from another publication, you must get a permission from author or publisher to use the picture in your work and the picture must be cited properly (Author, year, with permission). If the picture is licensed with copyright licence allowing free distribution of it (e.g. Creative Commons license), you may still have to cite the original author or work. Giving the credit to the original author by citing them is always a good and ethical practice, even if it would not be otherwise required. If for example a diagram is adapted (redrawn and changed) from an existing diagram in another publication, the picture must be cited properly (adapted from Author, year). See the referencing guide.

Again, proper referencing must be followed (see the APA referencing style).

Lists are used when summing issues. In academic writing the use of lists should be minimised. The lists are indented. Also lists must be discussed in the text. Similar to

tables and pictures, the interpretation must be given by the author regarding lists, too.

- A list is indented.

- The topics are talked in the body text.

- A chapter must not be ended with a list.

A list may also be numbered. In the next list you can see the styles utilised in the guideline.

1. ListItem

2. ListItemLast

3. ListItemNumbered.

Every picture and table must be referred in the text. There must be body text both before a picture and after a picture. A chapter may not begin or end with a picture, table or list. Furthermore, there must always be body text between two headings..

1.4   Emphasis and citations

Emphasis may be used in case the topic is really significant or it must be separated from the surrounding text. For emphasising, there is a style of *Emphasized*. It is done by *italics*.

Direct citations must be made carefully. "Short direct citations can be presented in the body text between quotation marks and including the reference." (Reference, year, page number). Longer citations (more than two rows of text) are separated by making them as a paragraph and indenting it. It is important to add full references as instructed in the APA style (American Psychological Association, 2019).

> *"Direct quotes longer than two rows of text are separated by making them as a paragraph and indenting it using Quote style. Remember to also add full reference." (Author, year, page number)*

Direct quotes from **interviews** should use Quote style regardless of the length of the quote.

1.5   Examples of codes and formulas

Code is presented by Courier New with size 10. The code must be explained in the body text (exception: it is axiomatic). Long lists of codes should be avoided.

```
public class B extends A {                              (1)
    public void setProp(String s) {
        this.prop = s;
    }
    private String prop;
}
```

The style CodeSample is defined for the examples.

Formulas are presented in the body text centred. If possible, general fonts are used. The following is a classic example of a formula.

$$E = mc^2 \qquad (1)$$

The formulas are numbered similar to tables, pictures and code. The number is placed on the right side. The chapter may not begin or end with a formula or code.

1.6   Footnotes

Footnotes may be used if they bring true additional value into the text. The references must be listed in the list of references, not in the footnotes. The footnotes may extend the discussion of concepts, for example.

The footnotes[1] are seldom really necessary. Therefore their use should be avoided. Every footnote is numbered and it is presented in the footer of the page it is referred to.

1.7   Page Numbers

Every page from title page to last appendix is numbered. However, the title page may not show the number. The number is placed 1 cm from upper edge and 2 cm from outer edge.

1.8   Contents

The table of contents includes all sections of the thesis from the abstract to the last appendices. The headings are indented so that the left column of the next level is even with previous column (Fig. 2). In the table of contents the line spacing is 1.

Contents

Figure 2: Example of the list of contents.

The table of contents should show only three levels of titles, in maximum. This is valid even if the thesis contains four heading levels. The table is titled by Contents.

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[1]This is a dummy footnote text

1.8.1 Sub sub Section 1

1.8.2 Sub Sub Section 2

1.8.2.1 Paragraph 1 / Can be used as sub sub sub section

1.8.2.1.1 Sub Paragraph 2 / Can be used as sub sub sub sub section

2 Use of References

In the thesis we follow the style introduced by The American Psychological Association (APA). The latest APA style can be found easily in the Internet and some sites provide guides on using APA style, too. See, e.g. https://libguides.murdoch.edu.au/APA and https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html

As the guideline is written according to the instructions, it enables the students to copy their text (without format) on the document and thus get their text into the right format. The format is to be used in the Bachelor Theses and in the Master's Theses. In case of other theses, essays or reports it is recommended that the students inquire their teachers if the guideline is to be followed or not.

The use of references includes both referring and building the list of references. In the thesis, the style of references and referencing follows the American Psychological Association version 7. The APA style can be found easily in the Internet and some sites provide a quick guide, too.

Useful APA guides: https://libguides.murdoch.edu.au/APA

https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html

2.1 Reference style

The APA reference guides how to make different kinds of references. The guide is versatile and if offers guidance about style and grammar matters, as well. Some guidance is available also on APA website [2].

For example, the instructions guide how to place a reference that refers to a single sentence or to several consecutive sentences. A general rule is that a reference after a paragraph refers to the whole paragraph while a reference at the end of a sentence refers to the one sentence only. In other words, the paragraph is based on the reference that is mentioned at the end of it. It is important to note the place of full stop when referring as it differs according to the usage of reference. The most important rule is that the reader must be aware of where the thought comes from - whether it is from prior literature or from the current study.

The next two examples are equal:

> Charness and Boot (2009) mark how bad design in technology is a potential reason to cause fear.

> Bad design in technology is a potential reason to cause fear (Charness & Boot, 2009).

Both of the sentences root from one origin that is shown differently in the sentences. Mark the place of the full stop after the parenthesis.

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[2] http://apastyle.apa.org/

In case of the original paper with its interesting results is not available it is referred as follows "As Lewin (1945) reported in his study on work practices (as cited in Rapoport, 1970), the tasks ..." and the article of Rapoport is listed in the references.

The next paragraph shows how several sentences are referred to in the end of a paragraph. Mark the omission of the full stop in the reference in the end of the paragraph:

> Avison et al. (1999) classify action research as a distinct qualitative research method because it links research and practice. Action research is argued to be ideal for studying information systems in practice because it serves different interests and it offers good means to improve practice in general. While action research combines theory and practice, it combines also researchers and practitioners through change and reflection. (Avison et al., 1999)

In case of a specific section (table, picture, list) it is necessary to enter the page number in the reference, for example (Lewis & Loftus, 2000, p. 185). In addition, if the section in the original source being cited is difficult to find, the page number is recommended in the reference.

If you want to cite multiple references for the same

Table 2 clarifies how to use 'et al.' in the thesis when citing references with many authors:

Table 2: Use of 'et al.' in the body text (Lee, n.d.).

Number of authors	Citations in parenthesis	Citations as part of text
tow	(Palmer & Roy, 2008)	Palmer and Roy (2008)
Three or more	(Sharp et al., 2007)	Sharp et al. (2007)

As shown in Table 2, two authors are always listed. If there are more than six authors, only the first author is informed in the citations. A special note regarding the list of references: if there are more than six authors only the first six authors are listed followed by three full stops …; and then the name of the last author is listed. (See the examples in the next chapter.)

2.2   References

The list of references is presented alphabetically according to the latest APA reference style. Line spacing is 1. The chapter is one of the main chapters (style Heading0) but it is not numbered. It is wise to generate the list of references with the help of reference management tool, such as RefWorks. However, it is not uncommon that some items in the reference list generated by such tool need further editing to meet the required APA standard. As described in the APA reference style, the article types influence the formatting of the reference. You can find good practical guides on how to apply the APA reference style from the Internet, e.g. https://libguides.murdoch.edu.au/APA is a nice short guide. Always use the latest version of the APA reference style. Next, some examples are given:

Books:

Gamma, E., Helm, R., Johnson, R., & Vlissides, J. (1995). *Design Patterns Elements of Reusable Object-Oriented Software*. Boston, MA, USA: Addison-Wesley Longman Publishing.

Halonen, R. (2011, October 21). *Online Discussion Forum as a Means of Peer Support* (Vol. Critical issues for the development of sustainable E-health solutions). https://doi.org/10.1007/978-1-4614-1536-7_10

Journal article:

Eerola, T., Kamarainen, J.-K., Lensu, L., Leisti, T., Halonen, R., Kälviäinen, H., Nyman, G., & Oittinen, P. (2010). Full Reference Printed Image Quality: Measurement Framework and Statistical Evaluation. *Journal of Imaging Science and Technology*, *54*, 1–13. https://doi.org/10.2352/J.ImagingSci.Technol.2010.54.1.010201

May, D., & Taylor, P. (2003). Knowledge Management with Patterns – Communications of the ACM. *46*(7), 94–99. Retrieved 01/02/2026, from https://cacm.acm.org/research/knowledge-management-with-patterns/

Conference article:

Beck, K., Crocker, R., Meszaros, G., Coplien, J., Dominick, L., Paulisch, F., & Vlissides, J. *Industrial experience with design patterns*. Berlin, Germany, 1996, 103–114. https://doi.org/10.1109/ICSE.1996.493406

Petillo, J., Panagos, D., Ovtchinnikov, S., Burke, A., Kostas, C., Held, B., DeFord, J., Nelson, E., Nguyen, K., Wright, E., Jensen, K., & Levush, B. *Status of the michelle code and applications*. 2010, 1–1. https://doi.org/10.1109/PLASMA.2010.5533967

Prasandy, T., Titan, Murad, D. F., & Darwis, T. *Migrating application from monolith to microservices*. 2020, 726–731. https://doi.org/10.1109/ICIMTech50083.2020.9211252

Rodriguez, E. R., Becu, O., Coppola, D., Duquerroy, L., Rinaldo, R., Schoenenberg, A., & Ginati, A. *Integrated applications demonstration projects: Showcases of user-driven applications demonstration projects combining satellite earth observation, navigation and telecommunications technologies*. 2012, 1–6. https://doi.org/10.1109/ESTEL.2012.6400135

Suhonen, K., Väätäjä, H., Virtanen, T., & Raisamo, R. *Seriously fun: Exploring how to combine promoting health awareness and engaging gameplay*. New York, NY, USA, 2008, October 7, 18–22. https://doi.org/10.1145/1457199.1457204

Xia, C., Li, J., Liu, Q., Liu, Q., Tang, Y., & Yao, Y. *Study on operational applications in crop growth and drought monitoring using multiple satellite data: Case study in xinjiang, china*. 2009, III-451-III–454. https://doi.org/10.1109/IGARSS.2009.5418289

Internet article:

Farah, J. (n.d.). *White Paper: CM: THE NEXT GENERATION - Agile Configuration Management*. Retrieved 01/02/2026, from http://www.neuma.com/NG06Apr.html

Specifically, no full stop is needed after the entry in case of Internet address.

Please note that even if the examples were given separately divided by the publication type (book, article, etc.) the total list of references must appear alphabetically as guided earlier.

References

Beck, K., Crocker, R., Meszaros, G., Coplien, J., Dominick, L., Paulisch, F., & Vlissides, J. *Industrial experience with design patterns*. Berlin, Germany, 1996, 103–114. https://doi.org/10.1109/ICSE.1996.493406

Eerola, T., Kamarainen, J.-K., Lensu, L., Leisti, T., Halonen, R., Kälviäinen, H., Nyman, G., & Oittinen, P. (2010). Full Reference Printed Image Quality: Measurement Framework and Statistical Evaluation. *Journal of Imaging Science and Technology*, *54*, 1–13. https://doi.org/10.2352/J.ImagingSci.Technol.2010.54.1.010201

Farah, J. (n.d.). *White Paper: CM: THE NEXT GENERATION - Agile Configuration Management*. Retrieved 01/02/2026, from http://www.neuma.com/NG06Apr.html

Field, M. (2021, January). Wild ride for london's bitcoin companies as digital coin tumbles. Retrieved 02/01/2021, from https://www.telegraph.co.uk/technology/2021/01/21/wild-ride-londons-bitcoin-companies-digital-coin-tumbles/

Gamma, E., Helm, R., Johnson, R., & Vlissides, J. (1995). *Design Patterns Elements of Reusable Object-Oriented Software*. Boston, MA, USA: Addison-Wesley Longman Publishing.

Halonen, R. (2011, October 21). *Online Discussion Forum as a Means of Peer Support* (Vol. Critical issues for the development of sustainable E-health solutions). https://doi.org/10.1007/978-1-4614-1536-7_10

May, D., & Taylor, P. (2003). Knowledge Management with Patterns – Communications of the ACM. *46*(7), 94–99. Retrieved 01/02/2026, from https://cacm.acm.org/research/knowledge-management-with-patterns/

Petillo, J., Panagos, D., Ovtchinnikov, S., Burke, A., Kostas, C., Held, B., DeFord, J., Nelson, E., Nguyen, K., Wright, E., Jensen, K., & Levush, B. *Status of the michelle code and applications*. 2010, 1–1. https://doi.org/10.1109/PLASMA.2010.5533967

Prasandy, T., Titan, Murad, D. F., & Darwis, T. *Migrating application from monolith to microservices*. 2020, 726–731. https://doi.org/10.1109/ICIMTech50083.2020.9211252

Rodriguez, E. R., Becu, O., Coppola, D., Duquerroy, L., Rinaldo, R., Schoenenberg, A., & Ginati, A. *Integrated applications demonstration projects: Showcases of user-driven applications demonstration projects combining satellite earth observation, navigation and telecommunications technologies*. 2012, 1–6. https://doi.org/10.1109/ESTEL.2012.6400135

Suhonen, K., Väätäjä, H., Virtanen, T., & Raisamo, R. *Seriously fun: Exploring how to combine promoting health awareness and engaging gameplay*. New York, NY, USA, 2008, October 7, 18–22. https://doi.org/10.1145/1457199.1457204

Xia, C., Li, J., Liu, Q., Liu, Q., Tang, Y., & Yao, Y. *Study on operational applications in crop growth and drought monitoring using multiple satellite data: Case study in xinjiang, china*. 2009, III-451-III–454. https://doi.org/10.1109/IGARSS.2009.5418289

Appendix A   The styles used in the document

Style	Font	Usage	Note
Title	Arial 20	The main title.	Bold
Subtitle	Arial 18	The sub title (if needed).	
AuthorInformation	Times New Roman 12	Author details on the cover sheet.	
Keywords	Arial 12, Italics	Title for keywords.	
Heading0	Arial 18	Title for foreword, abstract, contents, abbreviations, references and appendices.	No numbering
Heading1	Arial 18	Main chapter. Begins on a new page.	
Heading2	Arial 14	Second level title.	
Heading3	Arial 14	Third level title.	
Heading4	Arial 12, Italics	Fourth level title.	No numbering, not recommended.
Normal	Times New Roman 12	Body text.	
Emphasized	Times New Roman 12, Italics	Emphasised text in Italics.	
FigureCaption	Arial 10	Title for picture.	
TableCaption	Arial 10	Title for table.	
TableHeader	Arial 10, Bold	Title cells in table.	
TableText	Times New Roman 10	Text cells in table.	
ListItem	Times New Roman 12	List item.	
ListItemLast	Times New Roman 12	Last item in a list.	
ListItemNumbered	Times New Roman 12	Numbered item in a list.	
CodeSample	Courier New 10	Example of code.	
Quote	Times New Roman 12, Italics, Indented	Direct quotation longer than two rows	

Appendix B   General structure of a research article

A research can be reported according to the next structure. The order of the items is important.

Introduction

Introduce the research topic, why it is important, set the research in border scope

Say what research questions you want to solve. (Dummy citaiton) Xia et al., 2009.

Literature review or Previous Works

Summary of previous scientific works

Method

How the data collection happened and how the data is being analysed

Results

Express the results

Discussion

Discuss the significance of the finding, match or contradict with previous works

Talk about implications

Talk about new research scope

Limitations

The planned limitations and known shortcomings are reported. The reasons for them – if known – are explained from the viewpoint of the current research.

Conclusion

The prior literature is presented briefly with full sentences. All required references are included. Its relevance in the current research is described and limitations recognised in prior research are identified if possible. List of main prior literature in relation to the background theory Main background references are listed in the required format (APA).

Lähteet / References

Xia, C., Li, J., Liu, Q., Liu, Q., Tang, Y., & Yao, Y. *Study on operational applications in crop growth and drought monitoring using multiple satellite data: Case study in xinjiang, china*. 2009, III-451-III–454. https://doi.org/10.1109/IGARSS.2009.5418289