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DEPARTMENT OF ELECTRICAL, ELECTRONIC AND COMPUTER ENGINEERING

# **Style, Formatting and Other Guidelines for Research Proposals, Dissertations and Theses**

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# 1 INTRODUCTION

Research proposals need to be approved by the Postgraduate Committee. Furthermore, dissertations/theses first need to be submitted for **internal evaluation**. Following successful completion of the internal evaluation process, the dissertation/thesis may be submitted for **external examination**.

## *Nature of the internal evaluation process*

- Its purpose is to state whether formatting/style is acceptable or not.
- It does not have a tutoring function, i.e. its purpose is not to teach students how to format their documents – this information is described in full in this preparation guide and the templates (available on clickUP [EECE Postgraduate Students 20xx]).
- Limited, generic feedback is usually given with respect to problematic issues, and students are expected to check the whole document for similar issues and correct them.
- Its purpose is not to give feedback on language use, although issues that are incidentally picked up may be pointed out. Based on such issues, a student may be required to make use of the services of a professional language editor.

## **2 RESEARCH PROPOSALS**

### **2.1 M.Eng**

#### **2.1.1 Students who did not complete EIN732 Introduction to Research within a year from submission of the research proposal**

Prospective students must submit a document, drawn up by the student (in conjunction with the supervisor), in which the proposed research project is explained. Aspects, such as the nature of the problem, possible solutions, findings of a literature study, etc., must be addressed in the document (see Section 2.3 regarding templates). This document may not be longer than two A4 pages, and must be handed in at the postgraduate secretary (Mrs. Heleen Gous) within four months of the date of first registration. All research proposals will be critically evaluated by the Postgraduate Committee, and feedback given to the student/supervisor. Re-registration for the second year of study may be denied if the Postgraduate Committee is not in possession of an approved research proposal at that time.

A plagiarism declaration by the student must be submitted with the research proposal. The Postgraduate Committee reserves the right to submit research proposals to the Turnitin plagiarism software to be evaluated for plagiarism according to the standards as stated in the UP plagiarism policy document.

#### **2.1.2 Students who completed EIN732 Introduction to Research**

Students who (i) passed EIN732 Introduction to Research within a year from submission of the research proposal, (ii) will conduct the research as described in the proposal prepared for EIN732, *and* (iii) will continue with the research under supervision of the study leader employed for EIN732, may submit the research proposal prepared for EIN732 instead of the two page proposal required of students who did not complete the module. In such a case, a summary page needs to be submitted in addition to the EIN732 research proposal. The proposal must be handed in at the postgraduate secretary (Mrs. Heleen Gous) within four months of the date of first registration. All research proposals will be critically evaluated by the Postgraduate Committee, and feedback given to the student/supervisor. Re-registration for the second year of study may be denied if the Postgraduate Committee is not in possession of an approved research proposal at that time.

A plagiarism declaration by the student must be submitted with the research proposal. The Postgraduate Committee reserves the right to submit research proposals to the Turnitin plagiarism software to be evaluated for plagiarism according to the standards as stated in the UP plagiarism policy document.

### **2.2 PhD**

Prospective students must submit a document in which the proposed research project is clearly explained. Aspects, such as the nature of the problem, possible solutions, findings of a literature study, etc. must be addressed in the document. This document may not be longer than ten A4 pages, and must be handed in within 6 months after the date of first registration at the Postgraduate Secretary (Mrs. Heleen Gous). All research proposals will be critically evaluated by the Postgraduate Committee, and feedback given to the student/promoter. Re-registration for the second year of study may be denied if the Postgraduate Committee is not in possession of an approved research proposal at that time.

### **2.3 TEMPLATES**

Templates for research proposals are available on clickUP [EECE Postgraduate Students 20xx]. Proposals that do not adhere to the format will not be considered.

## 3 DISSERTATIONS AND THESES

### 3.1 TEMPLATES

Templates are available on clickUP [EECE Postgraduate Students 20xx].  
[https://clickup.up.ac.za/ultra/courses/\\_175339\\_1/cl/outline](https://clickup.up.ac.za/ultra/courses/_175339_1/cl/outline)

### 3.2 LAYOUT OF THESIS OR DISSERTATION

- Title page. See Section 3.3 for the correct name of the degree that you are enrolled for.
- Summary, with keywords
- List of abbreviations and acronyms (do not include very common abbreviations)
- List of symbols (optional)
- Table of contents
- List of tables (optional)
- List of figures (optional)
- Chapters
- References
- Appendix

### 3.3 NAMES OF DEGREES

Kindly ensure that you use the correct name for the degree that you are enrolled for in your thesis or dissertation.

<b>MEng</b>	<b>Code</b>	<b>Full name of degree</b>
MEng (Electrical Engineering)	EIR 890	Master of Engineering (Electrical Engineering)
MEng (Electronic Engineering)	EIN 890	Master of Engineering (Electronic Engineering)
MEng (Computer Engineering)	ERI 890	Master of Engineering (Computer Engineering)
MEng (Bioengineering)	EIB 890	Master of Engineering (Bioengineering)
MEng (Microelectronic Engineering)	EEY 890	Master of Engineering (Microelectronic Engineering)
<b>MSc</b>		
MSc (Applied Sciences)	EER 891	Master of Science (Applied Sciences)
<b>PhD</b>		
PhD (Electrical Engineering)	EIR 990	Philosophiae Doctor (Electrical Engineering)
PhD (Electronic Engineering)	EIN 990	Philosophiae Doctor (Electronic Engineering)
PhD (Computer Engineering)	ERI 990	Philosophiae Doctor (Computer Engineering)

### 3.4 FONTS, LINE AND PARAGRAPH SPACING

#### 3.4.1 Spacing

- Left margin: 3 cm
- Right margin: 2.5 cm
- Top margin: 2 cm
- Bottom margin: 2 cm
- Line spacing: 1.5× font spacing
- Paragraph spacing: 3× font spacing

#### 3.4.2 Font

- Times Roman (Aa Bb Cc Gg) font, black.
- Size of font for text: the font size should be either 11 point or 12 point.
- Size of font for header and footer and footnotes: 11 point
- Size of font for table captions, and table cell entries: 11 point
- Size of font for figure captions: 11 point
- Size of font for annotations within figures: at least 8 point

### 3.5 HEADERS AND FOOTERS

#### 3.5.1 Header

CHAPTER 1	INTRODUCTION
-----------	--------------

Chapter titles on the right of the header should be truncated if needed to avoid multiple lines in header.

#### 3.5.2 Footer

Department of Electrical, Electronic and Computer Engineering University of Pretoria	1
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Headers and footers begin on the second page of the first chapter and must appear on every page except on the first page of a chapter.

### 3.6 LITERATURE REFERENCES

The literature referencing style must strictly follow *either* the IEEE method or the Harvard method. The IEEE referencing style guide, and examples of the Harvard referencing style are available on clickUP.

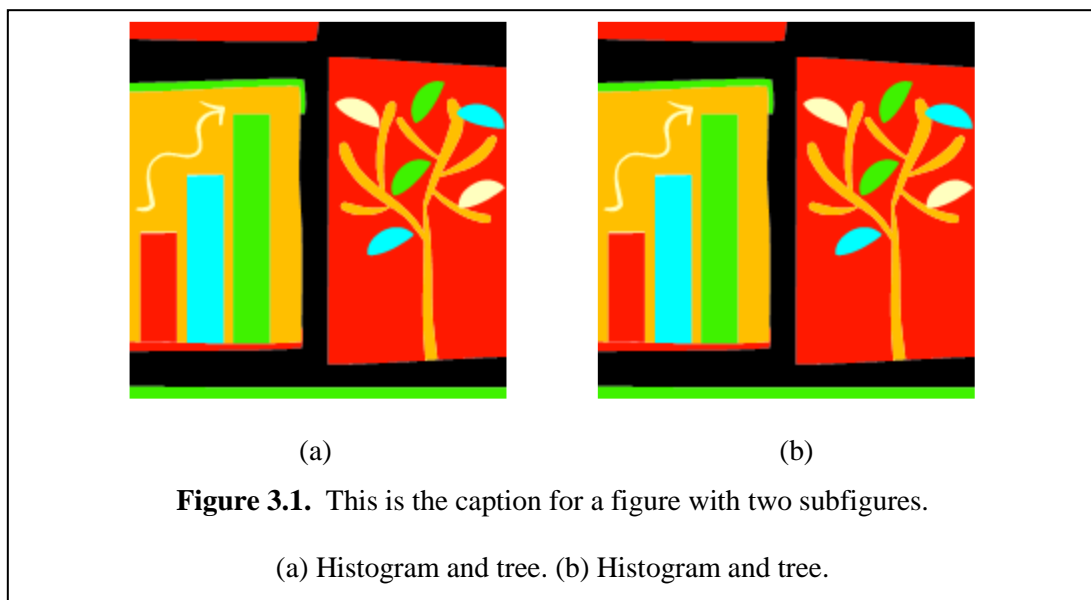
Note that automatic bibliography generation tools available within LaTeX tend to be unreliable. *You need to check by hand each bibliography entry against the IEEE (or Harvard) referencing style guideline to see whether the formatting is correct.*

Please note that the two referencing methods may not be interchanged.

### 3.7 FIGURES AND GRAPHS

#### 3.7.1 General

- The vertical dimension must normally not be smaller than 8 cm.
- The number of the figure (chapter\_number.figure\_number, e.g. **Figure 3.1**) and caption may not be smaller than 11 pt and must be centred *underneath* the figure/graphs.
- There should not be frames around figures and graphs.
- The size of the font used in figures and graphs must be at least 8 point and the same letter type (Times Roman, Helvetica or Arial) must consistently be used in *all* figures. This also applies to figures taken from references, i.e., if possible the figure should be regenerated with appropriate fonts, unless the nature of the figure is such that it cannot be regenerated.
- Use 600 dpi minimum resolution for raster art; vector art is preferred for graphs and diagrams. For a description of the difference, see:  
<https://www.adobe.com/creativecloud/file-types/image/comparison/raster-vs-vector.html#:~:text=An%20easy%20way%20to%20tell,without%20losing%20any%20image%20quality.>
- Figures with subfigures should use the following layout and caption convention:



#### 3.7.2 Copyright clearance and referencing of material subject to copyright clearance

In general, if *any* material (not only figures, but also data sheets, etc) is copied from an external source, obtaining permission to do so is mandatory. This holds regardless of whether the material, e.g. figure, has been altered. If you copy the main/core idea of a figure, you will need to apply for permission, even though you may have redrawn the figure from scratch. Captions to figures, etc., should reflect that permission has been obtained.

##### Copying from non-IEEE sources:

- If the figure is an exact copy of a figure from a non-IEEE source, the final sentence of the figure caption must read (e.g.)

Taken from Loizou (2006), with permission.  
 If the figure is not an exact copy of the figure in the source, its caption must read  
 Adapted from Loizou (2006), with permission.  
 The above applies to the Harvard referencing style. For IEEE referencing style, the above would become  
 Taken from [12], with permission.  
 etc.

#### Copying from IEEE sources:

An exception involves copying a portion (e.g., figure, graph, table) of an IEEE copyrighted paper for reproduction in a dissertation or thesis. In such cases it is **not** necessary to apply for copyright permission. However, the copied material should be properly referenced, in the case of figures/graphs and tables by also displaying the IEEE copyright line in the caption, e.g.,

Taken from [12], © 2011 IEEE.

or

Adapted from [12], © 2011 IEEE.

In the case of short quotes from the text, the original source should be fully referenced followed by the IEEE copyright line. For more information, see

[https://www.ieee.org/content/dam/ieee-org/ieee/web/org/pubs/permissions\\_faq.pdf](https://www.ieee.org/content/dam/ieee-org/ieee/web/org/pubs/permissions_faq.pdf)

Please be aware that it could take up to two months to obtain copyright clearance for some materials.

### 3.8 TABLES

- Font size not smaller than 11 point.
- The number of the table (chapter\_number.table\_number, e.g. **Table 3.1**) and caption may not be smaller than 11 pt and must be centred *above* the table.
- Tables should not be separated by page breaks. If a table spans multiple pages, the caption should be repeated on each page with a “(continued)” qualifier in the caption.

Table 3.1. This is a table caption.				
Column 1	Column 2	Column 3	Column 4	Column 5
Table 3.2 (continued). This is a table caption.				
Column 1	Column 2	Column 3	Column 4	Column 5

If a table contains many columns and does not fit within the page width, the entire table (along with its caption) may be rotated counter-clockwise by 90 degrees.

### 3.9 HEADINGS

- Chapter headings in large **CAPITAL LETTERS** and bold print (see template).
- Other headings: the same font size as the text.
- Main section headings in **CAPITAL LETTERS** and bold print, e.g.,  
**1.1 INTRODUCTION**
- Sub-section headings: bold, sentence case, i.e. capitalize only the first letter except in the case of abbreviations or names that occur in the heading, e.g.,  
**2.1.1 Background to game theory**
- Numerical number system is used: chapter\_number.section\_number, e.g. 5.1
- All subheadings need to be numbered, but the table of contents needs only contain headings up to level 3 headings:
  - level 1: chapter title
  - level 2: main section headings, e.g. **1.1 INTRODUCTION**
  - level 3: sub-section headings, e.g. **2.1.1 Background to game theory**
- Refer to the numbering and heading format of this document as an example.
- Chapter headings should not consist of acronyms/abbreviations only.

### 3.10 LISTS OF ABBREVIATIONS, FIGURES, TABLES AND SYMBOLS

- A list of abbreviations forms part of the dissertation or thesis (the list should not include very commonly used abbreviations) and should be ordered alphabetically.
- Latin and Greek alphabet symbols in the list of symbols should be listed separately and each sub-list ordered alphabetically according to the respective alphabet.
- Lists of figures, tables or symbols are optional.

### 3.11 EQUATIONS

- Equations are numbered by chapter, e.g., Equation 4 in Chapter 1 is numbered (1.4).
- The numbers are placed in brackets against the right hand margin.
- Equations are centred in the text.
- If an equation is part of a sentence, then there must be a comma after the equations. If the sentence is ended with the equations, then the equation follows with a full stop.

Ohm's law is stated as

$$V = IR, \quad (1.1)$$

where  $V$  is voltage,  $I$  is current and  $R$  is resistance. This may also be stated as

$$I = V/R. \quad (1.2)$$

- Equation numbers must use the same font face and size as the text.
- Insert more extensive example from template on how one should refer to equations within text.

### 3.12 EXAMPLES OF REFERENCING OF CHAPTERS, SECTIONS, TABLES, FIGURES, AND EQUATIONS

In Chapter 6 details are listed .... In Section 2.6 a procedure is described .... Table 2.1 gives a summary of .... In Figure 2.2 ....

Equation (2.1) [an example of a numbered equation] gives the relationship between terminal current  $I$  and voltage  $V$ :

$$V = IR \quad (2.1)$$

where  $R$  is the resistance. [Note that variables should be given in *italic* font type.]

The relationship between terminal current  $I$  and voltage  $V$  has been given in (2.1) above [example of referring to an equation within a sentence].

Equation (2.2) shows an example of a numbered equation.

$$\Delta w_{i,j} = \alpha a_i \Delta[j] \quad (2.2)$$

When referring to an equation within a sentence, use (2.2).

$$\begin{aligned} \mathbf{QXa} &= \mathbf{Qy} \\ \therefore (\mathbf{QX})^T \mathbf{QXa} &= (\mathbf{QX})^T \mathbf{Qy} \\ \therefore \mathbf{a} &= ((\mathbf{QX})^T \mathbf{QX})^{-1} (\mathbf{QX})^T \mathbf{Qy} \\ &= (\mathbf{X}^T \mathbf{Q}^T \mathbf{QX})^{-1} \mathbf{X}^T \mathbf{Q}^T \mathbf{Qy} \\ &= (\mathbf{X}^T \mathbf{WX})^{-1} \mathbf{X}^T \mathbf{Wy} \end{aligned} \quad (2.2)$$

### 3.13 APPENDICES

- Appendices are given the main headings "APPENDIX A", "APPENDIX B", etc.
- Equations in the appendix are numbered as (A.1), (A.2), etc.
- Appendices are bound at the end of the dissertation/thesis.

### 3.14 COMMON FORMATTING ERRORS

During screening the Postgraduate Committee will use the following checklist to provide feedback in cases where the formatting does not match the Style, Formatting, and Other Guidelines. Please use the guidelines below to identify and trace remaining formatting errors.

#### 3.14.1 Document layout

- There are errors on the front page. *Common errors include incorrect name of degree, formatting of title, submission date, but check for other errors as well.*
- The layout of the document does not match that prescribed in the Style, Formatting, and Other Guidelines.
- The keywords are formatted incorrectly. *Keyword should be presented alphabetically, the first keyword should be capitalized, and the list terminated with a fullstop.*
- The table of contents is not formatted correctly. *Common errors include missing or incorrect page numbers, or text that overlaps page numbers, but check for other errors as well.*

- There is disagreement between the figures / tables in the lists, and the figures / tables in the document.
- The document's whitespace usage is incorrect. *Ensure that the whitespace, or number of blank lines, are applied consistently in the document around headings, figures, tables and equations, and that it is not excessive or absent altogether.*
- There are problems with the headers or footers of the document. *Ensure that the footer text matches the prescriptions of the Style, Formatting, and Other Guidelines exactly, and that chapter titles in the header are short enough not to result in multi-line headers.*
- There are other problems with the layout of the document. *Please consult the Style, Formatting, and Other Guidelines.*

### 3.14.2 Errors in typesetting

- Incorrect referencing to chapters, sections, figures or equations. *When referring to a specific chapter, section or figure, the reference is capitalized. See, for example, "In this chapter, the findings of Section 2.3 and Chapter 7 are discussed. The subsequent figure will show that the results in Figure 1.5 are correct."*
- Page borders are not respected. *Ensure that all text, equations, figures and tables fall within the page borders.*
- The fonts in the headings, body text or captions do not match the Style, Formatting, and Other Guidelines.
- Spaces are used incorrectly. *Typical problems include omitting the space between a citation and a preceding word, e.g. "... has been shown previously[1]" or missing space between a numerical value and unit, e.g. "... found to be 1m long."*
- There are missing or broken cross-references in the text.
- There are other errors in typesetting. *Please consult the Style, Formatting, and Other Guidelines.*

### 3.14.3 Captions

- Captions are not uniformly terminated with a fullstop.
- There are other problems with captions. *Please consult the Style, Formatting, and Other Guidelines.*

### 3.14.4 Figures

- Graphs are not formatted uniformly. *All graphs should be formatted the same. This include uniform choices of axis fonts, unit indicators, line styles, legends, and other graph elements.*
- Graph axes are not labelled, or labelled incorrectly. *Be sure to add labels and units to graph axes where appropriate.*
- The letter type used in figures is too small or too large. *Consult the Style, Formatting, and Other Guidelines on minimum font sizes to use in figures.*
- Figures are visibly pixelated. *Use 600dpi minimum resolution for raster art; vector art is preferred for graphs and diagrams.*
- Figures have visibly distorted aspect ratios. *This is most evident from examining typeface in figures. Check for horizontal or vertical elongation in the figures.*
- Copyright is not acknowledged correctly in figure captions. *Please consult the Style, Formatting, and Other Guidelines for the exact formatting of copyright acknowledgements in figure captions. Pay careful attention to the difference between exact reproductions and adaptations.*
- Figures contain titles. *The department Style, Formatting, and Other Guidelines stipulate that figures should have a single caption below the figure. Remove figure titles above the figure.*
- There are other errors in the formatting of figures. *Please consult the Style, Formatting, and Other Guidelines.*

### 3.14.5 Tables

- Tables are not formatted uniformly. *Ensure that the use of line styles and weights, as well as cell fill and bold typeface, is uniform across all tables.*
- Tables are not centred.
- Tables should not be separated by page breaks unnecessarily. *If a table spans multiple pages, the caption should be repeated on each page with a “(continued)” qualifier in the caption.*
- There are other problems with tables. *Please consult the Style, Formatting, and Other Guidelines.*

### 3.14.6 Equations

- Equations are not formatted correctly. *Please consult the guide for exact formatting of equations.*
- Equations’ math typesetting is incorrect or of poor quality. *Please use the correct mathematical typesetting tools.*
- Equations do not flow correctly in body text. Consider this example:  
"Ohm's law is stated as  
$$V = IR, \quad (1.1)$$
*where V is voltage, I is current and R is resistance. This may also be stated as*  
$$I = V/R. \quad (1.2)"$$
*Note the absence of colons and semicolons, and the correct usage of commas and fullstops.*
- There are other errors in the formatting of equations. *Please consult the Style, Formatting, and Other Guidelines.*

### 3.14.7 References

- The references include inconsistent use of DOIs or URLs. *DOIs and URLs are generally not necessary for published works, such as conference and journal papers, but may be included. They should, however, be included or omitted uniformly.*
- The references do not apply capitalization in titles correctly. *Common errors include lowercase inclusion of acronyms, such as “vlsi” or “5g”, or all uppercase titles. Similarly, ensure that journal or conference proceedings titles are capitalized correctly, as well as author names and initials.*
- The reference is not always formatted correctly for its type. *The most common problem is journal papers presented as conference proceedings, or vice versa. Ensure that the type of source is captured correctly in the reference manager.*
- Online sources are not cited correctly. *Carefully distinguish between websites, online reports, datasets or arXiv preprints. Note the differences between Sections D, K, O, and P in the IEEE Reference Guide.*
- The references are not formatted uniformly. *Common errors include inconsistent inclusion or omission of publication month, conference location, publisher of conference proceedings, or volume numbers. Journal or proceedings titles should also be abbreviated uniformly, or not.*
- Compound references are not presented correctly. *In IEEE reference style, multiple references must be presented in numerical order and enclosed in a single set of brackets, e.g. [1, 5, 7] and not [1][7][5].*
- Some references have incomplete information. *Ensure that sources are described adequately.*
- References with large numbers of authors are not abbreviated correctly. *Use “et al.” for papers with more than six authors.*

There is some other problem with references. *Please refer to these sources for exact formatting guidelines:*

<https://ieeeauthorcenter.ieee.org/wp-content/uploads/IEEE-Reference-Guide.pdf>

<https://www.mendeley.com/guides/harvard-citation-guide/>

### **3.15 LENGTH OF DISSERTATIONS AND THESES**

- As a general guideline a master's dissertation should not exceed 100 to 120 pages and a PhD thesis should not exceed 150 to 180 pages *in total*.
- If the length of the dissertation or thesis is judged by the Postgraduate Committee to be inappropriate, the candidate could be instructed to condense the document.

### **3.16 LANGUAGE EDITING**

- Please note that the responsibility for language editing of the document is the student's. While students are allowed to submit theses and dissertations that are not professionally edited, the postgraduate committee does recommend professional language editing before dissertations and theses are submitted for internal evaluation. Please note that language editing may be assessed in addition to the technical content of a thesis or dissertation when a final mark is determined by the exam panel.