VISTEC THESIS TEMPLATE:
A COMPLETE LATEX THESIS PREPARATION VERSION 2

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Author Name
18 August 2025

VISTEC Thesis Template:
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Abstract

Author Name

This abstract presents a dummy content block intended to simulate a real thesis abstract. It spans multiple paragraphs and includes enough text to overflow onto the second page. The purpose of this demonstration is to observe how LaTeX handles hanging indents and vertical spacing, especially in custom environments such as keywords. By designing an extended abstract, it becomes possible to test page layout, margin consistency, and typographic behavior across different environments.

Keywords: No more than 5 words, LaTeX formatting, Thesis template, Abstract layout, Hanging indent.

Contents

Contents (Cont.)

List of Tables

List of Figures

List of Abbreviations

EEG	Electroencephalogram
MI	Motor Imagery
CNN	Convolutional Neural Network
H_2O	Water
DBU	1,8-Diazabicyclo[5.4.0]-7-undecene

Chapter 1

Introduction

1.1 Motivation

Brain-Computer Interfaces (BCIs) have emerged as a transformative technology enabling direct communication between the human brain and external devices. This field holds immense potential for applications in assistive technologies, neurorehabilitation, and human-computer interaction, offering new hope for individuals with motor disabilities. However, designing effective BCIs remains challenging due to the inherent variability in brain signals, the presence of noise, and the limited availability of high-quality datasets.

Despite significant advancements in machine learning and signal processing, many current BCI systems struggle with generalization across users, sessions, and tasks. Addressing these challenges requires innovative approaches to improve robustness, adaptability, and scalability. This thesis is motivated by the need to develop methodologies that not only enhance the performance of EEG-based BCIs but also make them more reliable and practical for real-world deployment.

1.2 Contributions

This thesis makes the following key contributions:

- We introduce a novel experimental paradigm that addresses key limitations in the current research.
- We propose a novel algorithm that enhances learning performance across multiple tasks.

1.3 Outline

This thesis is organized into the following chapters:

Chapter 1 Introduction: Introduces the research motivation, key contributions, and provides an overview of the thesis structure.

Chapter 2 Background: Provides a comprehensive overview of the fundamental concepts, theoretical foundations, and prior research that form the basis of this thesis.

Chapter 3 How to Use This Template: Offers practical guidance on using the VISTEC LaTeX thesis template, along with examples demonstrating how to format and organize paragraphs, sections, equations, algorithms, tables, figures, citations, and footnotes.

Chapter 4 VISTEC Thesis Formatting: Illustrates standardized formatting examples for a VISTEC thesis, covering headings, equations, algorithms, tables, figures, citations, and footnotes to ensure consistency throughout the document.

Chapter 5 Conclusion: Summarizes the major findings, discusses their implications, and suggests future research directions.

Appendix A Proofs Supporting Investigation: Presents supplementary materials, including detailed proofs, additional results, and extended discussions that support the main chapters.

Chapter 2

Background

2.1 Overview

This chapter provides a comprehensive overview of the fundamental concepts, theoretical foundations, and related work that underpin the research presented in this thesis. It serves to establish the necessary background and contextual framework for the subsequent chapters.

2.2 Fundamental Concepts

This section introduces the key concepts relevant to this study. It covers the principles, terminologies, and foundational ideas required to understand the technical contributions of the thesis.

Chapter 3

How to Use This Template

3.1 Introduction to Template Usage

This chapter introduces how to use and customize the VISTEC LaTeX thesis template. It outlines the overall file structure, class options, metadata configuration, and common formatting examples.

3.2 Getting Started with LaTeX

If you are new to LaTeX, it is recommended to start by learning its core concepts—such as document structure, environments, referencing, and compilation. A comprehensive beginner resource is available on the Overleaf Learn platform:

`https://www.overleaf.com/learn`

3.3 Directory Structure

The template is organized into modular directories to simplify file management and collaboration. The key components include:

- `main.tex` — The central file to compile the thesis.
- `thesisinfo.tex` — Metadata: title, author, advisors, program, etc.
- `contents/` — Main chapters, appendices, abstract, and other body text.
- `figures/` — All figures and illustrations used throughout the thesis.
- `tables/` — External table files (optional).
- `bibliography.bib` — BibTeX reference database.

3.4 Configuring Document Class Options

The `VISTEC` document class provides configurable options to adapt the template for different degree levels and academic programs. These options must be declared in

`main.tex` using the `\documentclass` command.

3.4.1 Required Options

You must specify both degree type and school/program. The supported values include:

- **Degree Type:**
  - `phd` — For doctoral degrees
  - `master` — For master's degrees
- **School and Program:**
  - `ist` — Information Science and Technology
  - `ese` — Energy Science and Engineering (e.g., Chemical Engineering)
  - `mse` — Molecular Science and Engineering
  - `bse` — Biomolecular Science and Engineering

If your school or program is not predefined, manually set `\degreefield`, `\school`, and `\program` in `thesisinfo.tex`.

3.4.2 Optional Layout Options

You may also enable optional class features to assist in layout checking:

- `final` — Compiles the document in final form (default).
- `showframe` — Draws visible layout frames (e.g., margins).
- `showgrid` — Displays a background grid to assist element alignment.

Use these options for visual debugging during drafting. Disable them for final submission.

3.4.3 Example Declaration

Below is an example for a Ph.D. student in the ESE school enabling layout frames:

File: `main.text`

```
\documentclass[phd, ese, showframe]{VISTEC}
```

3.5 Editing Thesis Metadata

All metadata (title, author, year, student ID, advisors, etc.) is stored in `thesisinfo.tex`. These values populate the title page, approval page, and headers/footers as required.

3.5.1 Manual Line Break in Title

If your title is too long or includes a natural division (e.g., a colon), insert `\linebreak` with an optional strength value `[0]`-`[4]`:

- 0 : Suggest break if needed
- 1-3: Increasing strength
- 4: Force break

Example: breaking after the colon in the title.

File: `thesisinfo.tex`

```
\title{VISTEC Thesis Template:\linebreak[2] A Complete LaTeX Thesis
↪  Preparation Version 2}
\authortitle{Mr.}
\author{Author Name}
\studentid{1888888}
```

This formatting improves layout on the title page and avoids overfull lines or unbalanced text.

3.6 Organizing Chapter Content

Each main chapter—such as *Introduction*, *Background*, *Investigation*, and *Conclusion*—should be placed in a separate file under the `contents/` directory. These files are included in the main document using the `\include{}` command within `main.tex`. You may add additional chapters as needed while keeping consistent structure across sections, figures, tables, and citations.

For instance, to add an abstract page, create a new file named `contents/abstract.tex` with the following content:

File: `contents/abstract.tex`

```
This is a placeholder abstract. Summarize your research goals, methods, results, and conclusions concisely.

\keywords{LaTeX formatting, Thesis template, Abstract, Hanging indent, Research summary}
```

Then, include it in `main.tex` before the first chapter:

File: `main.tex`

```
\include{contents/abstract}
```

3.7 Structuring Headings and References

To maintain consistent formatting and referencing throughout the thesis, each section, subsection, and subsubsection should be labeled using `\label`. These can be referenced using `\autoref` for automatic prefixing (e.g., "Section", "Figure", "Table", etc.). See Section 3.7 for an example of heading structure and references.

File: `contents/xxx.tex`

```
% Section
\section{Introduction}
\label{sec:intro}

% Paragraph
\begin{paragraph}
This is a paragraph. Refer to \autoref{sec:background}.
\end{paragraph}

% Subsection
\subsection{Background}
\label{sec:background}

% Subparagraph
\begin{subparagraph}
This is a subparagraph expanding on background context.
\end{subparagraph}

% Subsubsection
\subsubsection{Detailed Context}
\label{subsec:detailed}

% Subsubparagraph
\begin{subsubparagraph}
This subsubparagraph elaborates on the discussion in \autoref{sec:background}.
\end{subsubparagraph}
```

3.8 Customizing List Indentation

List indentation enhances hierarchy and readability, especially in technical writing. This template defines three custom indentation levels using macros: `\paritemindent`, `\subparitemindent`, and `\subsubparitemindent`. You may also use explicit units (e.g., `cm`, `pt`) for fine-grained control.

The following code demonstrates how to use these indentation settings in `enumerate` and `itemize` environments:

File: `contents/xxx.tex`

```
% Custom indentation using predefined macros
\begin{enumerate}[itemindent=\paritemindent]
  \item First-level list item (using paritemindent)
\end{enumerate}

\begin{enumerate}[itemindent=\subparitemindent]
  \item Second-level list item (using subparitemindent)
\end{enumerate}

\begin{enumerate}[itemindent=\subsubparitemindent]
  \item Third-level list item (using subsubparitemindent)
\end{enumerate}

% Manual indentation using fixed units
\begin{itemize}[itemindent=2cm]
  \item Manually indented item using 2cm
\end{itemize}

\begin{enumerate}[itemindent=20pt]
  \item Manually indented item using 20pt
\end{enumerate}
```

3.9 Formatting Tips and Layout Troubleshooting

This section provides practical tips to resolve common LaTeX formatting issues in your thesis, including overfull lines, missing continuation headers in lists, and manual page breaks.

3.9.1 Fixing Overfull `\hbox` Warnings

If LaTeX produces an "Overfull `\hbox`" warning, it typically means that a word or line is too long to break naturally. You can fix this in two main ways:

- **Define custom hyphenation points** using `\hyphenation{}` in the

preamble.

- **Insert a manual line break** in the body using `\newline` where appropriate.

3.9.1.1 Example 1: Hyphenation Rule in Preamble

This method lets LaTeX know how to break specific long words when needed:

File: `main.tex`

```
\hyphenation{neurorehabi-litation} %% Will break as neurorehabi-litation
\hyphenation{inherent}             %% Applied to resolve issue on page 1
```

3.9.1.2 Example 2: Manual Line Break with `\newline`

You may also manually split overly long lines or sentences using `\newline`:

File: `contents/xxx.tex`

```
% Within a paragraph environment
This sentence is getting too long and exceeds the margin, so we insert a
↪ break.\newline
Here is the continuation on the next line with proper indentation.
```

Note that `\newline` should be used sparingly and only in body text—not inside math or figure captions—unless absolutely necessary.

3.9.2 Forcing a Page Break

To manually start a new page, you can use:

```
\newpage
```

3.9.3 Fixing Missing Continuation Headers in Lists

If the continuation header (e.g., `List of Tables (Cont.)`) does not appear correctly on the second or subsequent pages, you can insert a dummy entry into

the list to force a layout update. This dummy entry is invisible but helps LaTeX trigger the continuation header logic properly.

To apply this fix, add the following line at the very end of your `main.tex` file:

File: `contents/main.tex`

```
% main.tex (at the very end)
\addtocontents{lot}{\protect\contentsline{table}{\phantom{Dummy Invisible Table Entry}}{\phantom{\thepage}}{}}
\addtocontents{lof}{\protect\contentsline{figure}{\phantom{Dummy Invisible Figure Entry}}{\phantom{\thepage}}{}}
\addtocontents{toc}{\protect\contentsline{chapter}{\phantom{Dummy Invisible TOC Entry}}{\phantom{\thepage}}{}}
% \addtocontents{loa}{\protect\contentsline{algorithm}{\phantom{Dummy Invisible Algorithm Entry}}{\phantom{\thepage}}{}}
```

These dummy entries do not produce any visible output, but they help ensure that continuation headers such as "List of Tables (Cont.)" or "Contents (Cont.)" appear on subsequent pages. You can uncomment or adjust the relevant lines depending on which list is affected.

3.9.4 Forcing Continuation Headers in the List of Abbreviations

If the continuation header (e.g., `List of Abbreviations (Cont.)`) does not appear on the second page, you can force a page break manually using `\newpage` between entries. This is necessary because most abbreviation packages do not support dummy entries through `\addtocontents`.

For example:

File: `contents/abbreviations.tex`

```
% contents/abbreviations.tex
\newabbr{EEG}{Electroencephalogram}
\newabbr{MI}{Motor Imagery}
\newabbr{CNN}{Convolutional Neural Network}
\newabbr{\ce{H2O}}{Water}
\newpage % Force second page (to trigger continuation header)
\newabbr{DBU}{1,8-diazabicyclo[5.4.0]-7-undecene}
```

Insert `\newpage` where a page break is needed to trigger the second-page header. Use it only when the list flows beyond one page and the continuation header fails to render automatically.

Chapter 4

VISTEC Thesis Formatting

4.1 Overview

This chapter presents examples of standardized formatting for a VISTEC thesis, including guidelines for headings, equations, algorithms, tables, figures, citations, and footnotes. Each example demonstrates the intended structure and style to ensure consistency throughout the document.

4.2 Headings

This section provides an example of a paragraph placed under a main section heading. It is used to introduce and briefly describe the topic or content area that will be elaborated upon in the following subsections. Use `\autoref{ch4:subheadings}` to refer to Section 4.2.1.

4.2.1 Subheadings

This subsection demonstrates the formatting for subheadings. Text under a subheading serves to further detail specific aspects of the main section, offering a more focused discussion within the broader topic.

4.2.1.1 Second-Level Subheading

This is a subsubparagraph under the second-level subheading. It is typically used for listing or elaborating fine-grained points.

1) This is the first item in the enumerated list.
2) This is the second item in the enumerated list.
3) This is the third item in the enumerated list.

4.3 Equations

The following is an example of formatting mathematical equations. As illustrated in Equation 4.1, the *Rényi entropy* is defined as:

$$H_\alpha(X) = \frac{1}{1-\alpha} \log \left(\sum_{x \in \mathcal{X}} P[X = x]^\alpha \right). \tag{4.1}$$

4.4 Figures

Figures can be included easily using the `graphicx` package. Example shown in Figure 4.1 and Figure 4.2.

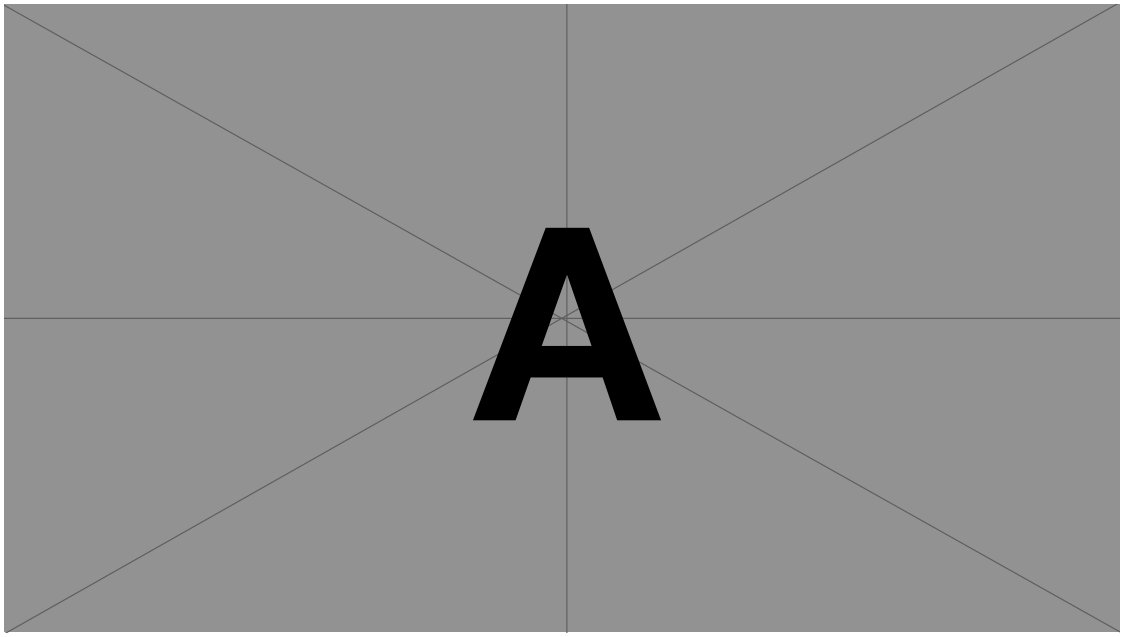

Figure 4.1 Example figure with long caption. This figure demonstrates how to include a standard image (e.g., PDF, PNG, JPG) into your document. Long captions should be aligned properly.

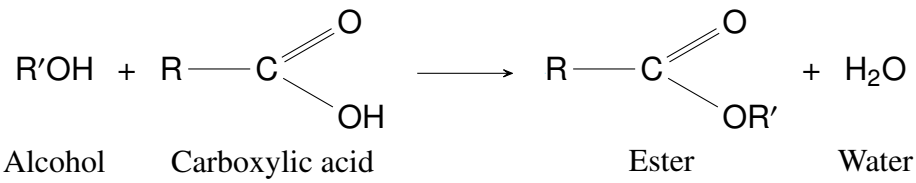

Figure 4.2 An esterification reaction illustrated using the `chemfig` package.

4.5 Tables

LaTeX table generators, such as TablesGenerator.com, can help you easily create well-formatted tables. See Table 4.1 for an example.

Table 4.1 Classification performance. An asterisk (*) indicates statistically significant results ($p < 0.05$).

Comparison Model	Subject-independent	
	Accuracy ± SD	**F1-score ± SD**
FBCSP-SVM	64.96 ± 12.70	65.25 ± 15.14
Deep Convnet	68.33 ± 15.33	70.20 ± 15.18
EEGNet-8,2	68.84 ± 13.87	70.39 ± 14.30
Spectral-Spatial CNN	68.27 ± 13.56	65.86 ± 17.37
MIN2Net	**72.03 ± 14.04***	**72.62 ± 14.14***

4.6 Algorithms

Algorithms can be presented using the `algorithmic` package, as shown in Algorithm 4.1.

Algorithm 4.1 An example algorithm with a caption.

Require: $n \geq 0$
Ensure: $y = x^n$
1: $y \leftarrow 1$
2: $X \leftarrow x$
3: $N \leftarrow n$
4: **while** $N \neq 0$ **do**
5: $\quad X \leftarrow X \times X$
6: $\quad N \leftarrow \frac{N}{2}$ ▷ example comment
7: **end while**

4.7 Citations

To cite references, use `\cite{}`, such as [1], or multiple sources like [2–4]. Ensure that the corresponding BibTeX entries are added to the `bibliography.bib` file before citing. Below is an example BibTeX entry:

File: `contents/chapter4.tex`

```
1 To cite references, use \verb|\cite{}|, such as \cite{id1}, or multiple
  ↪  sources like \cite{id2, id3, id4}.
```

File: `bibliography.bib`

```
@ARTICLE{id1,
  author  = {Author, One and Author, Two and Author, Four},
  journal = {Journal of Placeholder Research},
  title   = {A Placeholder Title for Demonstration Purposes},
  year    = {2022},
  volume  = {99},
  number  = {9},
  pages   = {100--110},
}
```

4.8 Footnotes

You can insert a footnote marker using `\footnotemark`[1] and define the text later with `\footnotetext{Example footnote.}`

[1] Example footnote.

Chapter 5

Conclusion

This chapter concludes the thesis by summarizing the key findings, discussing their implications, and outlining potential future directions for research in the field.

References

1. Author O, Author T, and Author F. A Placeholder Title for Demonstration Purposes. **Journal of Placeholder Research**. 2022;99(9):100–110.
2. Author A and Author B. **A Dummy Book Title for Example Use**. Fictional Press, 1979.
3. Author F, Author B, and Baz A. Simulated Study on EEG Activity in Hypothetical Conditions. **Journal of Experimental Interfaces**. 2020;55(8):8888–8899.
4. Author O, Author B, and Author G. Sample Article on Deep Learning for EEG. **Journal of Artificial Neuroscience**. 2017;12(4):321–340.

Appendix A

Proofs Supporting Investigation

A.1 Proof of Lemma

This section presents the detailed proof of the lemma introduced in Chapter 4. The proof follows standard mathematical derivation steps and verifies the correctness of the stated result.

Author's Biography

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	Author A and Author B. **A Dummy Book Title for Example Use**. Fictional Press, 1979.
	Author R, Author O, and Author B. **A Sample Conference Paper on Face Recognition**. Proceedings of the International Conference on Vision Research; 2015. p. 101–110.