

TITLE OF THE THESIS

by

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TITLE OF THE THESIS

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ACKNOWLEDGMENTS

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ACADEMIC ETHICS AND INTEGRITY STATEMENT

I, Adil Deniz Duru, hereby certify that I am aware of the Academic Ethics and Integrity Policy issued by the Council of Higher Education (YÖK) and I fully acknowledge all the consequences due to its violation by plagiarism or any other way.

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ABSTRACT

TITLE OF THE THESIS

Abstract and keywords should be on the same single page. Type your abstract here. Abstract should be a single paragraph not longer than one page and should not contain any references. The aim of the dissertation is to study the cognitive cost of several language and visual processing tasks with ear temperature measurement in comparison with functional near-infrared spectroscopy (fNIRS). Three verbal auditory experiments were carried out to compare the cognitive cost of processing words from native (Turkish) and non-native (English) languages. Experiments revealed a greater temperature increase in the left ear than in the right, indicating a greater left-hemispheric activity for language processing as expected. Furthermore, processing words from a non-native language was found to induce a greater temperature increase compared to that from the native language. Lastly, it was found that ear temperature measurements dissociated task difficulty by showing the greatest temperature increase in the most difficult task. In the last auditory experiment, the frontal cortex hemodynamics of the subjects were also assessed with fNIRS yielding similar results.

Keywords: Tympanic Membrane Temperature, fNIRS, Language Processing, Visual Processing, Be Careful To Write Initials With Uppercase Letters.

ÖZET

TEZİN TÜRKÇE BAŞLIĞI

Türkçe tez özetini buraya yazınız. Özet ve Anahtar Sözcükler aynı sayfada olmalı, tek sayfayı aşmamalı ve referans içermemelidir.

Anahtar Sözcükler: Çeşitli, Anahtar, Sözcükleri, Buraya, Yazınız, Her Sözcüğün, Baş Harfini, Büyük Yazmayı, Unutmayınız.

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LIST OF TABLES

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LIST OF SYMBOLS

a_{ij}	Description of a_{ij}
α	Description of α

LIST OF ABBREVIATIONS

AEP	Auditory Evoked Potential
VEP	Visual Evoked Potential

1. L^AT_EX FORMAT FOR THESIS WRITERS

In order to allow the students to write their theses in the official format approved by the Biomedical Engineering Institute, a text style file named **bmetez.sty**, a bibliography style file named **bmetez.bst**, a bibliography source file **bmetez.bib** in BibT_EX format, and an instructions manual file named **bmetez.tex** (L^AT_EX source file of this document) have been provided for the users of L^AT_EX typesetting program. These files can be downloaded from the web page of the Biomedical Engineering Institute at <http://www.bme.boun.edu.tr/>. A good source book for learning more about L^AT_EX is Leslie Lamport's book [1]. There is Comprehensive T_EXArchive Network (CTAN) at the web address <http://www.dante.de> which is an enormous source of software and support for L^AT_EX. The most easiest way of writing and formatting your thesis is to use the L^AT_EX typesetting program. In that case, all you have to do is to follow the guidelines given below:

1. install a L^AT_EX software if it is not available on your computer. For the MS Windows users the following site has a convenient freeware package called MikTeX which can be downloaded from <http://www.miktex.org>.

There is also a user-friendly L^AT_EX editor called Texstudio which can be downloaded from

<https://www.texstudio.org/>.

2. after installing your L^AT_EX system and its editor, download the files, **bmetez.sty**, **bmetez.bst**, **bmetez.bib** and **bmetez.tex** from <http://www.bme.boun.edu.tr/>.

3. copy the file named **bmetez.tex** to a file in which you will edit your thesis. This is the source file of this manual that you are currently reading as well as a sample file that you will indent your thesis in.

4. when you typeset the file with L^AT_EX, the style file will automatically format your thesis to the appropriate form.

If you do not want to install L^AT_EX system on you computer, alternatively, you may use the portal **www.overleaf.com** by signing up for an account for yourself and doing all the editing and typesetting using the resources therein.

The figures which are in the encapsulated postscript (.ps or .eps extension) or JPEG formats (.jpg or .jpeg extension) can be inserted in the text. For pictures to be inserted in the text in postscript (.ps) or encapsulated postscript (.eps) format, download Ghostscripts <http://www.ghostscript.com/> and run the latex->ps->pdf option in L^AT_EXeditor environment. Each figure, table and equation is given a separate label which will be used for referring in the text.

The figures will be referred to as Figure 1.1. The tables will be referred to as Table 1.1.

1.1 How to insert Figures and Tables in the text

Commonly made mistakes about Figures are omitting the “.” for terminating the captions and exceeding the page margins from right and bottom.

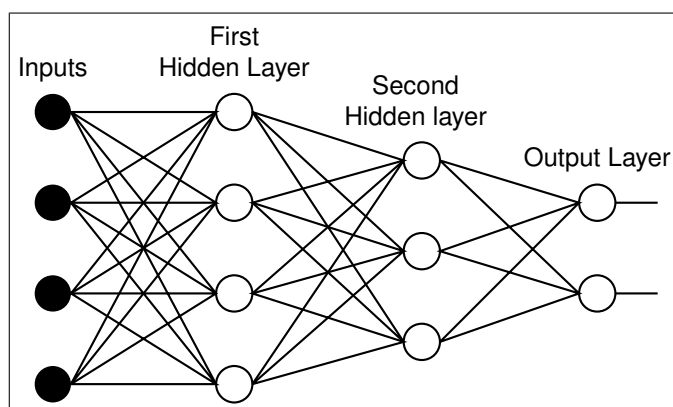


Figure 1.1 Figure Captions will have a font size of 10pts. If the figure caption is longer than a single line, it will wrap to the next lines.

Commonly made mistakes about Tables are omitting the “.” for terminating the captions, exceeding the page margins from right and bottom and using a text font

larger than 10pts for the entries inside the table.

Table 1.1

Table captions and the characters in table entries will be in 10 points. If the caption is longer than a single line, it will wrap to the next lines.

	Mean	Minimum	Maximum	Std.Dev
Stimulus peak in dB SPL Left ear	80.79	72	86	%2
Stimulus peak in dB SPL right ear	81.02	78	90	%2.2
TEOAE SNR in dB Left ear	11.35	-1.4	25.0	%49.4
TEOAE SNR in dB right ear	12.09	-1.4	26.0	%46.8

1.2 How to insert Equations in the text

The equations will be referred to as Eq. 1.1.

$$x = D \cdot \sin \phi \cdot \cos \theta \quad (1.1)$$

where $y = D \cdot \sin \phi \cdot \sin \theta$, $z = D \cdot \cos \phi$ and $D = \sqrt{x^2 + y^2 + z^2}$, $\phi = \arctan(y/x)$, $\theta = \arccos(z/D)$.

The easiest way of editing the references is to use the BibTeX package. The referred items are edited in a file called bmetez.bib. The **BIBTEX-entry** menu item of the **Special Menu** in the TeXed33 editor may be used for this purpose. For editing the BibTeX entry for website addresses, the reference is given as a book, as a journal article, as a conference proceeding etc. with an additional note of **Available: site/path/file** given in the **NOTE** field of each bibliographic item. Each reference must be given a label to be used for citing in the text. The formatted references as books [1], the journal articles [2], the technical reports [3], the book chapters [4], the theses [5, 6], the edited books [7, 8], and the website addresses [9] are exemplified in the References. Multiple references in series can be cited as [5]-[7].

1.3 List of publications produced from the thesis

1. Investigaton of the neuronal efficacy and EEG source power under steady-state visual stimulation, A. D. Duru, S. B. Erdogan, I. Kasikci, A. Bayram, A. Ademoglu, T. Demiralp, " *Engineering in Medicine and Biology Society, EMBC, 2011 Annual International Conference of the IEEE*, Vol. 4, pp. 6576-6579, Aug. 30–Sept. 3, 2011.
2. Source Localization of Subtopographic Brain Maps for Event Related Potentials (ERP) A. D. Duru, A. Bayram, T. Demiralp, A. Ademoglu, *Encyclopedia of Healthcare Informations Systems*, Vol. 3, pp: 1247-1252, 2010.
3. Analysis of brain electrical topography by spatio-temporal wavelet decomposition A. D. Duru, A. Ademoglu, T. Demiralp, *Mathematical and Computer Modelling*, Vol. 49, pp. 2224-2235, 2009.

2. COMMON MISTAKES COMMITTED BY THESIS WRITERS

1. WRONG

B.Sc., Biomedical Engineering, Başkent University

or

B.S., Biomedical Engineering, Başkent University

CORRECT

B.S., in Biomedical Engineering, Başkent University

2. Abstract/ÖZET ve keywords/anahtar kelimeler must all be placed in a single page.

3. Academic Ethics Statement page will be in its place.

4. Figure/table captions will be terminated by “.”

5. Citations will be separated by comma without spacing ; ex: [15],[17]

6. Font size in tables will 10pts.

7. When equations are referred

WRONG

equation (2.1)

CORRECT

Eq. 2.1

8. When there is a citation at the end of the sentence, it will be placed before the “.”

WRONG

where smallest error was present. [45].

CORRECT

where smallest error was present [45].

9. In the reference list, first letter of the journal names will be in capital

WRONG

Nature neuroscience

CORRECT

Nature Neuroscience

10. The sizes of the Tables and Figures will not exceed the right or bottom margin of the page.

11. You have to check carefully the reference lists given in BMETEZ.pdf and BMETEZ.BIB to format the reference properly. Usually, the thesis writers commit

errors in references. If the number of authors in a publication is more than four, then type just the first four author names and type “et al.” for the rest of the authors.

12. When tables and figure are referred,

WRONG

Fig. 2.1 or Tab 2.1

CORRECT

Figure 2.1 or Table 2.1

13. Chapter titles will be Upper case

WRONG

1.Introduction

CORRECT

1. INTRODUCTION

13. Thesis titles will be Upper case

WRONG

My Thesis Is Estimation

CORRECT

MY THESIS IS ESTIMATION

14. Books will be cited as specified in BMETEZ.PDF with initial letters of the titles to be in capital letters such as

Lamport, L., A Document Preparation System LATEX, New York: Addison-Wesley, 2nd ed., 1994.

APPENDIX A. TITLE OF THE FIRST APPENDIX

The appendices start here.

A.1 Appendix Section Heading

The Appendix section starts here.

A.1.1 Appendix Subsection Heading

The Appendix subsection starts here.

A.1.1.1 Appendix subsubsection heading. The Appendix subsubsection starts here.

The line spacing specifications between the paragraphs and headings for the appendix sections will be the same as those of the regular text sections.

REFERENCES

1. Lamport, L., *A Document Preparation System L^AT_EX*, New York: Addison–Wesley, 2nd ed., 1994.
2. Cao, L., Y. Hong, H. Fang, and G. He, “Predicting chaotic time series with wavelet networks,” *Physica D*, Vol. 85, pp. 225–238, Jan 1995.
3. Farmer, J. D., and J. J. Sidorowich, “Exploiting chaos to predict the future and reduce noise,” preprint, Los Alamos, LA-UR-88-901, 1988.
4. Principe, J. C., and P. Lo, “Towards the determination of the largest Lyapunov exponent of EEG segments,” in *Measuring Chaos in the Human Brain*, pp. 156–166, Singapore: World Scientific, 1991.
5. Duru, A. D., “Source localization of electrical dipoles in electroencephalogram (EEG),” Master’s thesis, Bogazici University, Istanbul, Turkey, 2004.
6. Arslan, R. B., *Novel methods to improve acquisition of transient evoked otoacoustic emissions for hearing screening*. PhD thesis, Bogazici University, Istanbul, Turkey, 2000.
7. Takens, F., *Detecting strange attractors in turbulence*, Vol. 898 of *Lecture Notes in Mathematics*, pp. 366–381. Berlin: Springer, 1981.
8. Aldroubi, A., and M. Unser, eds., *Wavelets in Medicine and Biology*, Boca Raton: CRC, 1996.
9. Jones, J., *Networks*, 2nd ed., Boca Raton: CRC, 1991. Available: <http://www.atm.com>.