

**AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING



## **BACHELOR'S THESIS**

**Title of Your Thesis - We Tested a Very Very Long Title to See  
What Happens in This Case Then We Made it Longer and We  
Can Make It Even Longer Than Longer**

**Student-1's Short Name, Student-2's Short Name, Student-3's Short Name,  
Student-4's Short Name**

November, 2022



**Title of Your Thesis - We Tested a Very Very Long Title to See  
What Happens in This Case Then We Made it Longer and We  
Can Make It Even Longer Than Longer**

A thesis submitted in partial fulfillment of the requirements for the degree of Bachelor  
of Science in Electrical and Electronic Engineering

Submitted by

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Dhaka, Bangladesh

November, 2022



## Declaration

We, do, hereby, certify that the work presented in this thesis, titled, "*Title of Your Thesis We Tested a Very Very Long Title to See What Happens in This Case Then We Made it Longer and We Can Make It Even Longer Than Longer*", is the outcome of the investigation and research carried out by us under the supervision of *Supervisor's Full Name*, Designation, Department of EEE, AUST. We also declare that neither this thesis nor any part thereof has been submitted anywhere else for awarding any degree, diploma, or other qualifications.

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Dhaka, Bangladesh  
Saturday 19<sup>th</sup> November, 2022

## Approval

The thesis titled **“Title of Your Thesis We Tested a Very Very Long Title to See What Happens in This Case Then We Made it Longer and We Can Make It Even Longer Than Longer”**, submitted by Student-1’s Full Name, Student-2’s Full Name, Student-3’s Full Name, and Student-4’s Full Name, in the Spring 2020 session, to the Department of Electrical and Electronic Engineering, Ahsanullah University of Science and Technology, has been accepted as satisfactory in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering and approved as to its style and contents on Saturday 19<sup>th</sup> November, 2022.

---

**Supervisor’s Full Name**

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Department of Electrical and Electronic Engineering

Ahsanullah University of Science and Technology

## **Dedication**

This work is dedicated to the Almighty. Also our beloved parents and teachers. This possibly could not be achieved without their help and support.

## Acknowledgement

Write your thanks here. Remember to thank everyone who contributed in any way to the accomplishment of this work.

Dhaka, Bangladesh  
Saturday 19<sup>th</sup> November, 2022



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# Abstract

Write your thesis abstract here.

A one-page abstract should be prepared. The abstract must be concise and the total word count should not exceed 250. The abstract will be checked by plagiarism software. So, original language from the students is essential.

Writing a good abstract requires a good knowledge of an analyzed theme, valuable background information, improved writing, and analytical skills. A good thesis abstract format includes the following significant elements.

- General background information
- Research hypotheses
- Methodology
- Conclusions
- Implications

The abstract should contain the following elements:

1. Aims: Defining the purpose of research.
2. Methods: Mentioning the research methods used. This part should be a direct description of what has been done. It is usually written in the simple past tense as it refers to completed actions.
3. Results and Conclusion: Summarizing the main research results. This part can be in the present or simple past tense. Highlighting only the most significant findings that will allow the reader to understand the conclusions. Conclusions are usually written in the present simple tense.

# 1

## Introduction

This chapter is for your introduction. Write here something about this chapter.

### **1.1 Background of the research**

What is your research all about? Why you are doing this?

### **1.2 Objectives of the study**

What are the objectives of your research? Mention them one by one.

1. First objective
2. Second objective
3. Third objective
4. Fourth objective
5. and so on

### **1.3 Scope of the study**

Scope of the contribution of the research.



## 1.4 Research methodology

Sample methodology

1. Literature review:
2. Data collection:
3. Data analysis and problem identification:
4. Field investigation:
5. Recommendations:

## 1.5 Organization of the thesis

A sample structure of the thesis can be written like this.

The research work performed in this study is divided into different topics and presented within six chapters including this chapter. The first Chapter of this research describes the background of the study, the objectives, and the scope of the study. The methodology of this study is also outlined in this chapter briefly.

The Second Chapter provides an extensive literature review based on bla bla bla. The European languages are members of the same family. Their separate existence is a myth. For science, music, sport, etc, Europe uses the same vocabulary. The languages only differ in their grammar, their pronunciation, and their most common words. Everyone realizes why a new common language would be desirable: one could refuse to pay expensive translators. To achieve this, it would be necessary to have uniform grammar, pronunciation, and more common words.

Chapter Three focuses on the key aspect of bla bla bla. If several languages coalesce, the grammar of the resulting language is more simple and more regular than that of the individual languages. The new common language will be more simple and more regular than the existing European languages. It will be as simple as Occidental; in fact, it will be Occidental. To an English person, it will seem like simplified English, as a skeptical Cambridge friend of mine told me what Occidental is. The European languages are members of the same family. Their separate existence is a myth.

The Fourth Chapter consists of statistics and analysis of bla bla bla. For science, music, sport, etc, Europe uses the same vocabulary. The languages only differ in their grammar, their pronunciation, and their most common words. Everyone realizes why a new common language would be desirable: one could refuse to pay expensive translators. To achieve this, it would be necessary to have uniform grammar, pronunciation, and more common words. If several languages coalesce, the grammar of the resulting language is more simple and more regular than that of the individual languages. The new common language will be more simple and more regular than the existing European languages.

It will be as simple as Occidental; in fact, it will be Occidental. To an English person, it will seem like simplified English, as a skeptical Cambridge friend of mine told me what Occidental is. The European languages are members of the same family. Their separate existence is a myth. For science, music, sport, etc, Europe uses the same vocabulary. The languages only differ in their grammar, and their pronunciation.

The Fifth Chapter of this research is about the investigation of some major bla bla bla. The European languages are members of the same family. Their separate existence is a myth. For science, music, sport, etc, Europe uses the same vocabulary. The languages only differ in their grammar, their pronunciation, and their most common words. Everyone realizes why a new common language would be desirable: one could refuse to pay expensive translators. To achieve this, it would be necessary to have uniform grammar, pronunciation, and more common words.



# 2

## Sections & Subsections

In this chapter, we will show the example of using sections and subsections, and sub-subsections. We will also present the example of listing both with numbers and without numbers

### **2.1 First Section of the Third Chapter**

And now I begin my third chapter here . . . And now to cite some more people

#### **2.1.1 First Subsection in the First Section . . .**

and some more

#### **2.1.2 Second Subsection in the First Section . . .**

and some more . . .

##### **2.1.2.1 First sub sub section in the second subsection . . .**

and some more in the first sub sub section otherwise it all looks the same doesn't it? well, we can add some text to it. . .

#### **2.1.3 Third Subsection in the First Section . . .**

and some more text . . .

### 2.1.3.1 First subsub section in the third subsection . . .

and some more in the first subsub section otherwise it all looks the same doesn't it? well we can add some text to it and some more and some more and some more and some more.

## 2.2 My First Section

I'm going to randomly include a picture Figure.

### 2.2.1 Enumeration

The following list is numbered.

1. The first topic
2. The second topic
  - (a) The first subtopic
    - i. The first sub subtopic
    - ii. The second sub subtopic
  - (b) The second subtopic
3. The third topic

### 2.2.2 Itemized

The following list is not numbered.

- The first topic
- The second topic
  - The first subtopic
  - The second subtopic
- The third topic

# 3

## Labeling and Referencing

This chapter will give you some idea about inserting labels and cross reference in the LyX.

### 3.1 Cross Referencing

Cross-referencing will automatically insert the number for Figure, Table etc. in your text. See these examples:

- Figure 3.1 is a sample figure.
- Table 3.1 is a table.

### 3.2 Section with images and sub-images

You should refer a figure as, “Figure 3.1 is a sample figure”. We will see some examples of using the image reference below.

Ohm’s law states that the current through a conductor between two points is directly proportional to the voltage across the two points. We are introducing the constant of proportionality, the resistance. The law was named after the German physicist George Ohm, who, in a treatise published in 1827, described measurements of applied voltage and current through simple electrical circuits containing various lengths of wire. Figure 3.1 shows the relationship between voltage and current.

A circuit diagram is a visual display of an electrical circuit using either basic images of parts or industry standard symbols. Symbol usage depends on the audience viewing

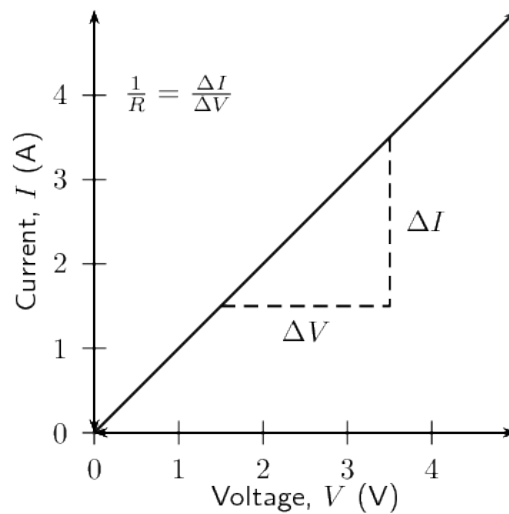
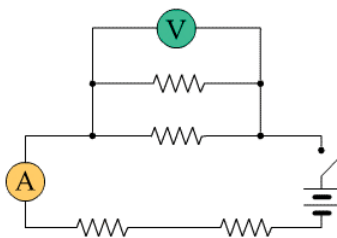


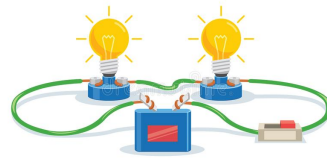
Figure 3.1: Voltage vs current graph

the diagram. Unlike a block diagram or layout diagram, a circuit diagram shows the actual electrical connections. A drawing meant to depict the physical arrangement of the wires and the components they connect is called artwork or layout, physical design, or wiring diagram. Figure 3.2a shows a sample circuit diagram. A series circuit is a circuit in which resistors are arranged in a chain, so the current has only one path to take.

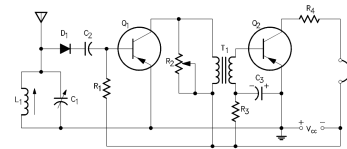
The current is the same through each resistor. We show an example of a very simple series circuit in Figure 3.2b. A circuit diagram (electrical diagram, elementary diagram, electronic schematic) is a graphical representation of an electrical circuit. A pictorial circuit diagram uses simple images of components, while a schematic diagram shows the components and interconnections of the circuit using standardized symbolic representations. The presentation of the interconnections between circuit components in the schematic diagram does not necessarily correspond to the physical arrangements in the finished device. We present a sample schematic diagram in Figure 3.2c.



(a) A simple circuit diagram



(b) A series circuit with bulb



(c) A sample schematic diagram

Figure 3.2: Different circuit diagrams

Moreover, Figure 3.2 shows three (03) different sub-images. But you can label all of them. Therefore you can use the labeling for any image in this template.

### 3.3 Section with a table

We also have a table, which we can refer to as Table 3.1.

Table 3.1: My first table

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Row 1	10	11	111	1111	11111
Row 2	20	22	222	2222	22222
Row 3	30	33	333	3333	33333

You can also create a complex table such as Table 3.2.

Table 3.2: My second table

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Row 1	10		111	1111	11111	111111
	20	22	222	2222		222222
Row 2	30	33	333	3333	33333	333333





# 4

## Citation Examples

In this chapter, we show how we can cite the references.

### **4.1 See the citation**

As discussed by authors in [1, 2, 3, 4] we can further show how this affects us. Moreover [5, 6, 7, 8] can be examples of the previous works. Among these [9, 10, 11, 12, 2] are the prominent ones. Also you can take a look at [13, 14, 15, 16, 17, 18, 19, 20].

### **4.2 And more of the citation**

As discussed by authors in [21, 22, 23, 24, 1, 3] we can further show how this affects us. Moreover [2, 25, 26, 27, 14] can be examples of the previous works. Among these [16, 28, 6, 29, 30, 12, 31] are the prominent ones. Also, you can take a look at [31].



# 5

## Equations & Algorithms

In this chapter, we will show the example of using equations.

### 5.1 Circuit analysis

In circuit analysis, three equivalent expressions of Ohm's law are used interchangeably:

$$I = \frac{V}{R} \quad (5.1)$$

$$R = \frac{V}{I} \quad (5.2)$$

$$V = IR \quad (5.3)$$

where  $I$  is the current through the conductor in units of amperes,  $V$  is the voltage measured across the conductor in units of volts, and  $R$  is the resistance of the conductor in units of ohms. More specifically, Ohm's law states that the  $R$  in this relation is constant, independent of the current. Ohm's law is an empirical relation that accurately describes the conductivity of the vast majority of electrically conductive materials over many orders of magnitude of the current. However some materials do not obey Ohm's law, these are called non-ohmic.

Now see how we cross-reference the equation.

Equation 5.1, 5.2 and 5.3 are quoted by some sources as the defining relationship of Ohm's law, or all three are quoted, or derived from a proportional form, or even just the

two that do not correspond to Ohm's original statement may sometimes be given.

## 5.2 Maximum power transfer theorem

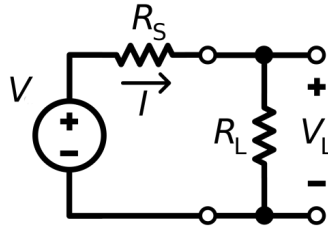


Figure 5.1: A simple source and load circuit.

In Figure 5.1, power is being transferred from the source, with voltage  $V$  and fixed source resistance  $R_S$ , to a load with resistance  $R_L$ , resulting in a current  $I$ . By Ohm's law,  $I$  is simply the source voltage divided by the total circuit resistance:

$$I = \frac{V}{R_S + R_L} \quad (5.4)$$

The power  $P_L$  dissipated in the load is the square of the current multiplied by the resistance:

$$P_L = I^2 R_L = \left( \frac{V}{R_S + R_L} \right)^2 R_L = \frac{V^2}{\frac{R_S^2}{R_L} + 2R_S + R_L} \quad (5.5)$$

The value of  $R_L$  for which this expression is a maximum could be calculated by differentiating it, but it is easier to calculate the value of  $R_L$  for which the denominator  $\frac{R_S^2}{R_L} + 2R_S + R_L$  is a minimum. The result will be the same in either case. Differentiating the denominator with respect to  $R_L$ :

$$\frac{d}{dR_L} \left( \frac{R_S^2}{R_L} + 2R_S + R_L \right) = -\frac{R_S^2}{R_L^2} + 1 \quad (5.6)$$

For a maximum or minimum, the first derivative is zero, therefore,

$$\frac{R_S^2}{R_L^2} = 1 \quad (5.7)$$

or

$$R_L = \pm R_S \quad (5.8)$$

In practical resistive circuits,  $R_S$  and  $R_L$  are both positive, so the positive sign in the above is the correct solution.

## 5.3 Algorithm

In this section, you will learn how to present an algorithm in your work.

An algorithm is an organized logical sequence of actions or the approach toward a particular problem. A programmer implements an algorithm to solve a problem. Algorithms are expressed using natural verbal but somewhat technical annotations. Whereas Pseudo code is simply an implementation of an algorithm in the form of annotations and informative text written in plain English. It has no syntax like any programming language and thus can't be compiled or interpreted by the computer. Algorithm 1 shows an example of using pseudo-code in your work.

---

**Algorithm 1** An algorithm with caption

---

**Require:**  $n \geq 0$

**Ensure:**  $y = x^n$

$y \leftarrow 1$

$X \leftarrow x$

$N \leftarrow n$

**while**  $N \neq 0$  **do**

**if**  $N$  is even **then**

$X \leftarrow X \times X$

$N \leftarrow \frac{N}{2}$

**else if**  $N$  is odd **then**

$y \leftarrow y \times X$

$N \leftarrow N - 1$

**end if**

**end while**

---

▷ This is a comment



# 6

## Index Creation

We will see how to create an index for the thesis book.

### 6.1 AUST

The Ahsanullah University of Science and Technology (AUST) was founded by the Dhaka Ahsania Mission in 1995.

Dhaka Ahsania Mission is a non-profit voluntary organization in Bangladesh. The Mission was established in 1958 by Khan Bahadur Ahsanullah, an outstanding educationist and social reformer of undivided India. With his own vision of a better society, characterized by a wealth of moral and spiritual values of the highest humanism that are universally acclaimed through the ages and manifested in every sphere of life social, economic, and cultural; and access to education and resources, he established the Mission. His remarkable educational reforms include among others introduction of the roll number system in the public examination and creating equal opportunity for education of all groups of people in the society.

Besides, he has contributed to society by writing a large number of books covering a wide range of areas from human and social life, history, human development, literature, religion, biography, moral values, etc.

Though initially, charity and welfare activities were the major focus of the Mission agenda, it has expanded its arena of activities leaning toward sustainable development strategies with the passage of time since the early 1980s.



## 6.2 Vision and mission of the university

The Ahsanullah University of Science and Technology will be the premier center of excellence in science, engineering, and technology by creating and transferring knowledge with a human touch to the young generations to come to enhance the quality of life in Bangladesh and beyond.

The mission of the Ahsanullah University of Science and Technology is to develop human resources in the fields of science, engineering, and technology to meet the ever-changing needs of society in the perspective of the highly complex and globalized world, and to do so it aims at producing quality graduates imbued with the spirit of ethical values and equipped with knowledge and skills appropriate to the fast-changing world so that they can face the challenges successfully wherever they are and contribute to the social and economic development of the country in their own humble way.

## 6.3 Objectives of the university

The aims and objectives of the University can be summarized as follows:

1. To impart need-based programs of science, technology, business and social sciences for the students who will attend classes at the University as well as who are unable to attend classes and desire home based study.
2. To offer programs covering all important fields and disciplines of science, technology, medical science, business, and social sciences including teachers' training.
3. To develop programs examining the modern trends on the need and development of science, technology, business, social sciences and human resource development; observing carefully the employment opportunities and market need both at home and abroad.
4. To organize programs in science, technology, business, and social science including teachers' training for awarding degrees, diplomas, and certificates of proficiency at all levels.
5. To arrange two methods of delivery
  - (a) in-campus education and
  - (b) open learning system.
6. To go for gradual expansion of departments and programs of learning as per rules and regulations of the Private University Act, 1992 and in accordance with the needs of the country and the demand abroad.

## 6.4 Campus

The permanent Campus of the University has been built on 5-bighas (1.676 acres) of land at Tejgaon Industrial Area which is located in the heart of Dhaka City. The land use in this area is quickly changing from an industrial area to a commercial area. The 10-storied building including 2-level basement has a total floor area of more than 4 lac sq.ft.

Continuous power and water supply are ensured by its own two generators, each of 1000 KVA, 2500 KVA sub-station, and 4-inch diameter deep tube-well. The campus also provides facilities for co-curricular activities like common rooms (male & female), indoor game rooms, etc. as well as space for car parking and heavy machinery labs in the basements.

## 6.5 Kazi Fazlur Rahman Library

Since the Library started work on the permanent campus, it has got a new dimension to serve the readers. Readers are getting a huge and wide space for study. The library has provided sufficient carrels for individual study and it can now accommodate about 200 readers in the reading room at a time. The library has also turned to Open Shelve System (OSS) which means readers now can browse books and journals directly from the shelves and can see other relevant materials at a time. Library workers are also there to help the readers.

The library has now got the facilities for the Faculties and Researchers to study in a separate corner. The library is going to establish an Internet browsing corner for research purposes.

It is a matter of great pleasure to announce that AUST is now linked with Bangladesh-INASP/PERI Consortia (BIPC) under the auspices of the Bangladesh Academy of Sciences (BAS) to have access to thousands of internationally reputed online journals and books with downloading facilities of full-text articles. The library is the focal point of this service.

There was a long-time demand for Automated Library Systems and to fulfill the demand a project for making software for this purpose has been undertaken in the meantime. After the completion of the work automated book search from the machine-readable catalog and mechanized book issue system will be available.

## 6.6 About EEE Department

The undergraduate program is accredited by professional bodies such as UGC, IEB (The Institute of Engineers, Bangladesh), IAE, BUET, etc. The department of EEE (Electrical & Electronic Engineering) is nationally and internationally recognized for its contribution to different fields of Electrical & Electronic Engineering. The graduates of this department

have gone on to a variety of positions in the industry such as Siemens Bangladesh, Ericsson, Grameen Phone, Robi, Banglalink, Airtel, Government services, PGCB GETCO, etc. Many students of the EEE department successfully transferred credit to many renowned American and Australian Universities. At present some graduates of the EEE department are doing their postgraduate degrees in Canada, Germany, the UK, the US, and Australia.

# Appendix

Some **Matlab** codes are shown below:

```
1 x=[1,3,-9,5,10];
2 n1=-1; %Defining the index of the first element of
3 n2=3; %Defining the index of the last element of
4 n=n1:n2; %Index of x M=500; %Total number of points in the
5 w=(-M/2:M/2)*2*pi/M %Frequency grid
6 W=exp(-j*w'*n) %Matrix formation
7 X=W*x';
8 subplot(2,1,1)
9 plot(w/(2*pi),abs(X),'k','linewidth',2)
10 xlabel('Digital frequency ,f')
11 ylabel('|X|f|')
12 title('Magnitude Spectrum')
13 subplot(2,1,2)
14 plot(w/(2*pi),angle(X)*180/pi,'k')
15 xlabel('Digital frequency ,f')
16 ylabel('angle X(f)')
17 title('Phase Spectrum')
```

A block of sample **python** codes are given below.

```
1 # Program to check if a number is prime or not
2 num = 407
3 # To take input from the user
4 # num = int(input("Enter a number: "))
5 # prime numbers are greater than 1
6 if num > 1:
7     # check for factors
8     for i in range(2,num):
9         if (num % i) == 0:
10             print(num,"is not a prime number")
11             print(i,"times",num//i,"is",num)
12             break
```

---

```
13         else:
14             print(num, "is a prime number")
15     # if input number is less than
16     # or equal to 1, it is not prime
17     else:    print(num, "is not a prime number")
18     # Program to check if a number is prime or not
19     num = 407
20     # To take input from the user
21     # num = int(input("Enter a number: "))
22     # prime numbers are greater than 1
23     if num > 1:
24         # check for factors
25         for i in range(2, num):
26             if (num % i) == 0:
27                 print(num, "is not a prime number")
28                 print(i, "times", num//i, "is", num)
29                 break
30             else:
31                 print(num, "is a prime number")
32     # if the input number is less than
33     # or equal to 1, it is not prime
34     else:    print(num, "is not a prime number")
```

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