



राष्ट्रीय प्रौद्योगिकी संस्थान, मणिपुर
NATIONAL INSTITUTE OF TECHNOLOGY, MANIPUR

Langol, Imphal - 795004, Manipur. Ph. (0385) 2445812 / 2058566

email:- nitmanipur@yahoo.in Website: www.nitmanipur.ac.in

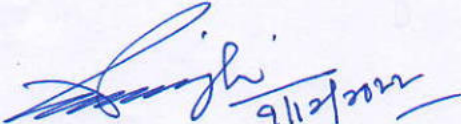
An Autonomous Institute under Ministry of Education (Shiksha Mantralaya), Govt. of India.

No.NITM.3/(3-Acad)/Notice/2022/249 .

Dated: December 9, 2022

Notice

Please refer to the 27th Senate meeting vide its item No. 27.7 resolution approved the guidelines for formatting/formulating Dissertation/Thesis for PhD, M.Tech, M.Sc and B.Tech. Taking into consideration the PhD thesis checking w.r.t Plagiarism, the Limit of similar word in a sentence will be 10. The percentage of similarity, including published papers shall be less than 30%. Plagiarism has to be checked by licensed software available in the institute. Plagiarism certificate will be signed by the Supervisor and Assistant Librarian of the institute. Approved guidelines for formatting/formulating Dissertation/Thesis for PhD, M.Tech, M.Sc and B.Tech are appended with this Notice.



(Prof. Kh. Tomba Singh)


Registrar
NIT Manipur

No.NITM.3/(3-Acad)/Notice/2022/249 .

Dated: December 9, 2022

Copy forwarded for information and necessary action to:

1. P.S to Director
2. Dean (AA)
3. All HoDs for wide circulation to all faculty members
4. All Assistant Registrars
5. Assistant Librarian
6. Technical Officer to publish the same on the Institute website and to circulate via mail to all faculty members through e-mail
7. Concerned file



(Prof. Kh. Tomba Singh)

Registrar
NIT Manipur



Guidelines for Formatting Dissertation

For PhD, M.Tech, M.Sc & B.Tech



NATIONAL INSTITUTE OF TECHNOLOGY MANIPUR
Langol, Imphal-795004

Dr. Bhanu Singh
01/11/22

Dr. Jyoti
01/11/22

Chandi malak
01/11/2022

Dr. Subodh
01/11/22

TITLE (Font size 18-20)

*A Thesis submitted
in partial fulfillment for the Degree of (italic font size 14)*

DOCTOR OF PHILOSOPHY

by

Name (font size 16)

Enrolment Number:(Font size 14)

**Under the Guidance of
Dr.**



DEPARTMENT OF

NATIONAL INSTITUTE OF TECHNOLOGY MANIPUR,

IMPHAL 795004

MONTH, YEAR

Handwritten signature
01/11/22

Handwritten signature
01/11/22

Handwritten signature
01/11/2022

Handwritten signature
1/11/22

© National Institute of Technology Manipur 2022
All rights reserved.



Handwritten signature

Handwritten signature
01/11/22

Handwritten signature
01/11/2022

Handwritten signature
01/11/22



DEDICATION

I would like to dedicate my thesis to my wonderful parents.

Sh. 75m Lh
01/11/22

Sh. 75m Lh
01/11/22

Chandri metalcard
01/11/2022

KL. Seelad
1/11/22



राष्ट्रीय प्रौद्योगिकी संस्थान, मणिपुर
NATIONAL INSTITUTE OF TECHNOLOGY, MANIPUR

Langol, Imphal, Manipur-795004, Ph. (0385) 2445812

Email:- nitmanipur@yahoo.in, Website:- www.nitmanipur.ac.in

An Autonomous Institute under MHRD, Govt. of India.

CERTIFICATE

This is to certify that the thesis entitled “.....” submitted by **Mr./Ms.** to the National Institute of Technology Manipur, Imphal, in partial fulfilment for the award of the degree of **Doctor of Philosophy** is a *bona fide* record of research work carried out by her under my supervision. The contents of this thesis, in full or in parts, have not been submitted to any other Institution or University for the award of any degree or diploma. We are satisfied with the volume, quality, correctness, and originality of the work.

[Name & Signature]
Co-Supervisor

[Name & Signature]
Principal Supervisor

[Name & Signature]
DPPC Chair

[Name & Signature]
External examiner

[Name & Signature]
DC Member

[Name & Signature]
DC Member

[Name & Signature]
DC Member

[Name & Signature]
DC Chairman

Place: NIT Manipur, Imphal

Date:

01/11/22

01/11/22

01/11/2022

01/11/22

PLAGIARISM VERIFICATION CERTIFICATE

1. Title of the Thesis:
2. Total Pages:
3. Name of the Scholar:
4. Department:
5. Name of the Supervisor:
6. Name of the Co-Supervisor:
7. Exclusion for Plagiarism check:
 - a. Cover page
 - b. Table of content
 - c. References
 - d. Software used:
 - e. Similarity index:%

Date:

Checked by:

Signature of Scholar

Signature of Supervisor

Signature of Assistant Librarian.

Kh. Zahid
01/11/22

[Signature]
01/11/22

Chandi mehtab
01/11/2022

Kh. Sachin
1/11/22



राष्ट्रीय प्रौद्योगिकी संस्थान, मणिपुर
NATIONAL INSTITUTE OF TECHNOLOGY, MANIPUR

Langol, Imphal, Manipur-795004, Ph. (0385) 2445812

Email:- nitmanipur@yahoo.in , Website:- www.nitmanipur.ac.in

An Autonomous Institute under MoE, Govt. of India.

STATEMENT

I do hereby declare that the matter embodied in this thesis entitled "....." is the result of investigations carried out by me under the supervision of Dr. in the Department of, National Institute of Technology Manipur, India.

In keeping with the general practice of reporting scientific observations, due acknowledgements have been made wherever the work described is based on the findings of other investigators.

(Student name & Signature)

Enrolment No.

National Institute of Technology Manipur

Handwritten signature and text in Hindi: . नैतिकता के लिए

Handwritten signature and date: 01/11/22

Handwritten signature and date: 01/11/22

vi

Handwritten signature and date: 01/11/2022

Handwritten signature and date: 01/11/22



राष्ट्रीय प्रौद्योगिकी संस्थान, मणिपुर
NATIONAL INSTITUTE OF TECHNOLOGY, MANIPUR

Langol, Imphal, Manipur-795004, Ph. (0385) 2445812

Email:- nitmanipur@yahoo.in , Website:- www.nitmanipur.ac.in

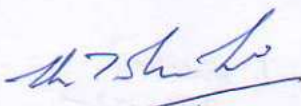
An Autonomous Institute under Education (MoE), Govt. of India.


Supervisors' Certificate

This is to certify that the work presented in the dissertation entitled
"....." submitted by
....., Enrollment Number, is a
record of original research carried out by him under our supervision and guidance in partial
fulfillment of the requirements of the degree of *Doctor of Philosophy* in
..... Neither this dissertation nor any part of it has been
submitted earlier for any degree or diploma to any institute or university in
India or abroad.

Name & Signature
Co-Supervisor

Name & Signature
Principal Supervisor


01/11/22


01/11/22

Chandi metakob
01/11/2022


11/11/22

DECLARATION

I certify that

- a. The work contained in this thesis is original and has been done by myself and the general supervision of my supervisor.
- b. The work has not been submitted to any other institute for any degree or diploma.
- c. Whenever I have used materials (data, theoretical analysis, results) from other sources, I have given due credit to them by citing them in the text of the thesis and giving their details in the references.
- d. Whenever I have quoted written materials from other sources, I have put them under quotation marks and given due credit to the sources by citing them and giving required details in the references.

Place: NIT Manipur, Imphal

Date:

(Student Name and Signature)

Enrolment No.:

Department of

National Institute for Technology Manipur

Kh. Shun Lih
01/11/22

Kh. Shun Lih
01/11/22

Chandi Mondol
01/11/2022

Kh. Sachin
01/11/22

ACKNOWLEDGEMENTS

I show my gratitude to a lot of people without whom I would not be able to finish my work. Their help, advice and support helped me tremendously during the course of my research.

Primarily, I would like to express my heartfelt gratitude and appreciation to my supervisor Dr. whose assistance and advice have guided me through all the stages of my course of research.

I take this opportunity to thank Prof. (Dr.) Goutam Sutradhar, Director – NIT Manipur, Prof. (Dr.), (Academic Affairs), and Doctoral Committee members Dr....., NIT Manipur for their comments, suggestions, cooperation and support.

Place: NIT Manipur, Imphal

Date:

(Student Name and Signature)

Enrolment No.:

Department of

National Institute for Technology Manipur

Ch. N. S. S.

Chandi malakor
01/11/22

Chandi malakor
01/11/2022

K. S. S. S.
1/11/22

ABSTRACT

Write the abstract of the dissertation followed by 3 to 7 keywords or phrases. An abstract is a micro dissertation. Both the dissertation and abstract should answer the following few questions —

- What was done?
- Why was it done?
- How was it done?
- What was found?
- What is the significance of the findings?

In the abstract section, one should answer the above questions in short paragraphs. The total length of the abstract should typically be limited to two pages.

Mention 3 to 7 keywords, phrases, or index terms in ***bold-italics*** separated by semicolons.

These words should be carefully chosen in a manner that they convey sufficient information on what the dissertation is all about. These words help other researchers to search and find your work.

Keywords: KW₁; KW₂; KW₃; KW₄; KW₅.

th-7 Shm Kd
01/11/22

Shr
01/11/22

Chandi melakod
01/11/2022

KL. Seelgled
1/11/22

List of Figures

- 1.1 Cover page and spine. 2
- 1.2 Page size and margin. 6
- 1.3 Files and folders in NITRdissertationTemplateV4_5 9

[Signature]
01/11/22

[Signature]

[Signature]
01/11/2022

[Signature]
1/11/22

List of Tables

1.1 Font sizes to be used in the dissertation 7

kh. John Kh
01/11/22

John
01/11/22^{xii}

Chambi mado
01/11/2022

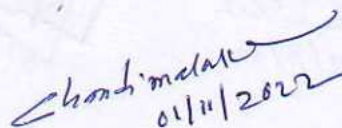
kh. Salil
1/11/22

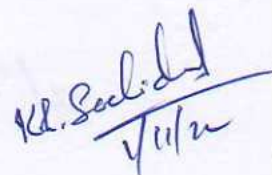
Abbreviations

AC	Activated Carbon
CA	Carbon Aerogel
CE	Counter electrode
CNTs	Carbon Nanotubes
CV	Cyclic-Voltammetry
CVD	Chemical Vapour Deposition
DI	Deionized
EDLC	Electrical Double Layer Capacitor
EDX	Electron Dispersive X-ray
EIS	Electrochemical Impedance Spectroscopy
EPD	Electrophoretic Deposition


01/11/22




01/11/2022


11/11/22

Notations

α	- Absorption coefficient
\AA	- Angstrom
Ag^{-1}	- Ampere per gram
ω	- Angular frequency
at. %	- Atomic percentage
C	- Capacitance
Q	- Charge
R_{CT}	- Charge Transfer Resistance
I_{corr}	- Corrosion current
E_{corr}	- Corrosion potential
I	- Current
C_{dl}	- Double-layer Capacitance
R_e	- Electrolytic Resistance

Ch. Sankar Reddy
01/11/22

[Signature]
01/11/22

xiv

Chandimolale
01/11/2022

K. Sankar Reddy
1/11/22

Nomenclatures

Bi	Bismuth
$\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$	Bismuth (III) Nitrate Pentahydrate
Bi_2O_3	Bismuth oxide
Cl	Chloride
Co_3O_4	Cobalt oxide
Cu	Copper
$\text{C}_2\text{H}_5\text{-OH}$	Ethanol
$(\text{Fe}(\text{NO}_3)_2 \cdot 9\text{H}_2\text{O})$	Ferric Nitrate
Au	Gold
N_2H_4	Hydrazine
$\text{H}_2\text{N-NH}_2$	Hydrazine hydrate
HCl	Hydrochloric acid
H_2O_2	Hydrogen peroxide
HI	Hydroiodic acid
Fe	Iron
$\text{Fe}(\text{NO}_3)_3$	Iron nitrate
Fe_3O_4	Iron oxide
Mg	Manganese
Ni	Nickel
Pd	Palladium
Pt	Platinum
KOH	Potassium hydroxide
KMnO_4	Potassium Permanganate
Ru	Ruthenium
SiO_2	Silicon dioxide
Ag	Silver
AgNO_3	Silver Nitrate

[Signature]
11/11/22

[Signature]
01/11/2022

[Signature]
11/11/22

TABLE OF CONTENTS

DESCRIPTION	Page No.
Certificate of Examination	ii
Plagiarism Verification Certificate	iii
Statement	iv
Supervisors' Certificate	iv
Declaration of Originality	v
Acknowledgment	vi
Abstract	vii
List of Figures	viii
List of Tables	ix
Abbreviations	x
Notations	xi
Nomenclatures	xii
Chapter 1 Introduction	1-28
1.1 Dissertation Arrangement	1
1.2 Dissertation Layout	2
1.3 Chapters	5
Chapter 2 Some Unstructured Advice on Dissertation Writing	29-48
2.1 Units	29
2.2 Significant figures	29
2.3 Grammar	34
2.4 Literature Review	
2.5 Materials and Methods	
2.6 Completeness and Transparency	
Chapter 3 Conclusion	49-75
References	49
Dissemination	49
Index	49

Sh. W. S. L.
01/11/22

Sh. S. S.
01/11/22 xvi

Chamdi matat
01/11/2022

Sh. Saebold
1/11/22

Chapter 1

Introduction

A treatise advancing a new point of view resulting from research is one of the compulsory requirements of an academic degree of NIT Manipur. Undergraduate students submit a project report in support of their candidature for B.Tech. degree. Similarly, Masters's students submit theses, and doctoral students submit dissertations. Unless otherwise stated explicitly, henceforth in this document the word "dissertation" will be used as a synonym for "report" and "thesis".

This document is intended to provide a guideline to students in the preparation of their dissertations. A dissertation is expected to have ethical standards and a uniform format with readability. NIT Manipur will accept dissertations only in pdf format, which should be uploaded directly to the Sudhaganga/Sudhagangotri dissertation submission web page for approval by the supervisor.

1.1 Dissertation Arrangement

Each dissertation must be arranged in the following serial order. Optional pages may not be included.

i. Cover Page

The cover page comprises the dissertation title, author's name, and institutional details. This page is excluded from the page number counter. A sample cover page design and spine design is shown in Figure 1.1.

ii. Title Page

The title page includes the title of the dissertation followed by the submission month-year, department, degree, author's name, and supervisors' names. Include this page in the pre-text page count, but do not place a page number on it. The top margin on this page shall be 60mm. [Sample Included]


iii. Certificate of Examination

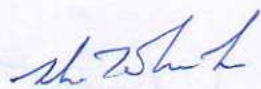
Include this page in the pre-text page count, but do not place a page number on it. If the Chairperson of the DC is the HoD then he will sign twice. The top margin on this page shall be 60mm. [Sample Included]

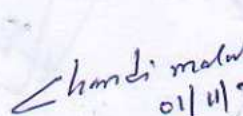
iv. Plagiarism Verification Certificate

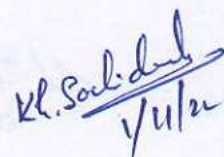
Self-verification plagiarism verification certificate needs to include. [Sample included]

v. Supervisor's Certificate


01/11/22




01/11/2022


1/11/22

An appropriate sample may be used depending on the number of supervisors. Include this page in the pre-text page count, but do not place a page number on it. The top margin on this page shall be 60mm. [Samples Included]

v. Dedication [Optional]

This dedication page should be limited to one page. The author may choose his/her preferred font and size. Include this page in the pre-text page count, but do not place a page number on it. The top margin on this page shall be 60mm.

vi. Declaration of Originality

The student is expected to declare that the work and ideas in his/her dissertation are all his/her own and original. Include this page in the pre-text page count, but do not place a page number on it. A sample declaration is included. The top margin on this page shall be 60mm. [Sample Included]

vii. Acknowledgment [Optional]

Include this page in the pre-text page count, but do not place a page number on it. The top margin on this page shall be 60mm.

viii. Abstract

Abstract followed by three to seven keywords/phrases should be written in this section on no more than two pages. One may follow single-line spacing in this section. Include this page in the pre-text page count, but do not place a page number on it. The top margin on this page shall be 60mm.

ix. Contents

Begin placing the page numbers at the bottom of this page, counting all preceding pages except the cover page. This counting should continue up to the page preceding the first page of the first chapter. Numbers should be in lowercase Roman numerals. Page numbers are centered 15mm from the bottom of the page. The content pages should be generated automatically with the aid of software used for dissertation preparation. [Sample Included]

x. List of Figures [Optional]

This section should be generated automatically with the aid of software used for dissertation preparation. Continue the page numbering with lowercase Roman numerals and place it 15mm from the bottom of the page. [Sample Included]

Kh. Zshu Kh
01/11/22

Kh. Zshu Kh
01/11/22 xix

Chandi m...
01/11/2022

Kh. Saib...
1/11/22

PhD
Thesis

Student Name

Thesis Title



NIT
Manipur

TITLE (Font size 18-20)

*A Thesis submitted
in partial fulfillment for the Degree of (italic font size 14)*
DOCTOR OF PHILOSOPHY

by
Name (font size 16)
Enrolment Number:(Font size 14)

**Under the Guidance of
Dr.**



DEPARTMENT OF
NATIONAL INSTITUTE OF TECHNOLOGY MANIPUR,
IMPHAL 795004
MONTH, YEAR

Kh. Sh. L.

01/11/22

Chandimata
01/11/2022

Kh. Seel. L.
1/11/22

This section should be generated automatically with the aid of software used for dissertation preparation. There should be only one "Reference" section in a dissertation and should be placed after the Conclusion Chapter and before Appendices if any. Continue page numbering with Arabic numerals. [Sample Included]

xviii. **Bibliography** [Optional]

A student may add a "Bibliography" section to present an exhaustive list of literature on the subject of the thesis. It is neither mandatory nor encouraged. Articles mentioned here need not be cited in the main text. Documents given in the "Reference" section may or may not be repeated in the bibliography.

xix. **Dissemination** [Optional]

There should be only one dissemination section in a dissertation and should be placed after the Reference section (or the Bibliography section, if there is one). Continue page numbering with Arabic numerals. [Sample Included]

xx. **Index** [Optional]

An index page comprises an alphabetical listing of some words or phrases along with the page numbers where they are discussed. Continue page numbering with Arabic numerals. [Sample Included]

Author's Official Name

Students must represent their full name as it is officially recorded at NIT Manipur. The sequence to be followed is First Name, Middle Name, and Last Name. This official name must be used in the dissertation. This name will appear on the degree certificate. This name must be the same as that on the Class X certificate. If there is a difference for any valid reason, please seek the permission of the Dean (AA) before submitting a dissertation.

1.2 Dissertation Layout

Students are advised to adhere to the following points while writing their dissertations.

a. **Institute logo**

It is a matter of pride to print the Institute logo in the dissertation. The printed logo should be contained in a square of 25mm on each side. Students are advised to use a high-resolution logo. A logo is provided in the dissertation writing template.

b. **Paper**

Essentially the same quality paper should be used throughout the dissertation. Use A4 size paper (210mm-297mm) of Executive Bond or comparable quality. The paper used in

Kh. 7 Sh. Kh
01/11/22

01/11/22 xxi

Chandimata
01/11/2022

KR. Saibol
11/11/22

dissertation printing should weigh 80gsm. However, 70 or 75 gsm are also acceptable, but not thinner.

c. Margin

All pages of a dissertation should have a consistent margin of —

- 31mm on the left edge,
- 25mm each on the right, top, and bottom edges.

Page numbers must be placed at least 15mm from the bottom of the page. A pictorial representation of the page layout is shown in Figure 1.2.

d. Printing

The dissertation must be printed in black ink unless the content demands the use of colours. Printing on a single side of the paper is advisable.

e. Spacing

The dissertation should be 1.5-spaced. However, Table of Contents, footnotes, graphs, tables, appendices, list of figures, list of tables, list of algorithms, references, bibliography, and index should be written in a single space. Two consecutive paragraphs should be separated by double line spacing.

f. Font

The entire dissertation must be written using only a single font including all the texts inside graphs, figures, block diagrams, *etc.* While writing captions of tables and figures, the font size should be decreased by one point. Similarly, the font size of the bibliography and index should also be lessened by a point. Students are advised to use the following in the body text —serif fonts like Times New Roman (TNR) of size 12pt or sans-serif fonts like Arial of size 11pt. Needless to say that the use of font should be uniform throughout. Headings, Titles, *etc.* should use fonts as given below in Table 1.1.

Cham L. m. m. m.
01/11/2022

M. S. S. S. S.
1/11/22

Table 1.1: Font sizes to be used in the dissertation

Item	Arial	TNR	Justification
Main Text	11 normal	12 normal	Justified
Sub-sub Heading	11 bold	12 bold	Left
Sub Heading	13 bold	14 bold	Left
Heading#	16 bold	17 bold	Left
Chapter Title	22 bold	24 bold	Center
Chapter Number	16 bold	17 bold	Left

Add serial number with one decimal place.

g. Colour of thesis

The Senate (item no. 12.6) approved the thesis cover for (i) B.Tech: Black (ii) M.Tech and M.Sc: Dark Maroon (iii) PhD : White

H. P. Sharma
01/11/22


01/11/22 xxiii

Chandimata
01/11/2022

H. P. Sharma
1/11/22

(a) = Page Width = 210

(b) = Page Height = 297

(c) = Text Width = 154

(d) = Text Height = 247

(e) = Left Margin = 31

(f) = Top Margin = 25

(g) = Head Separation = 5

(h) = Head Height = 5

(i) = Foot Skip = 10

All units are in mm.

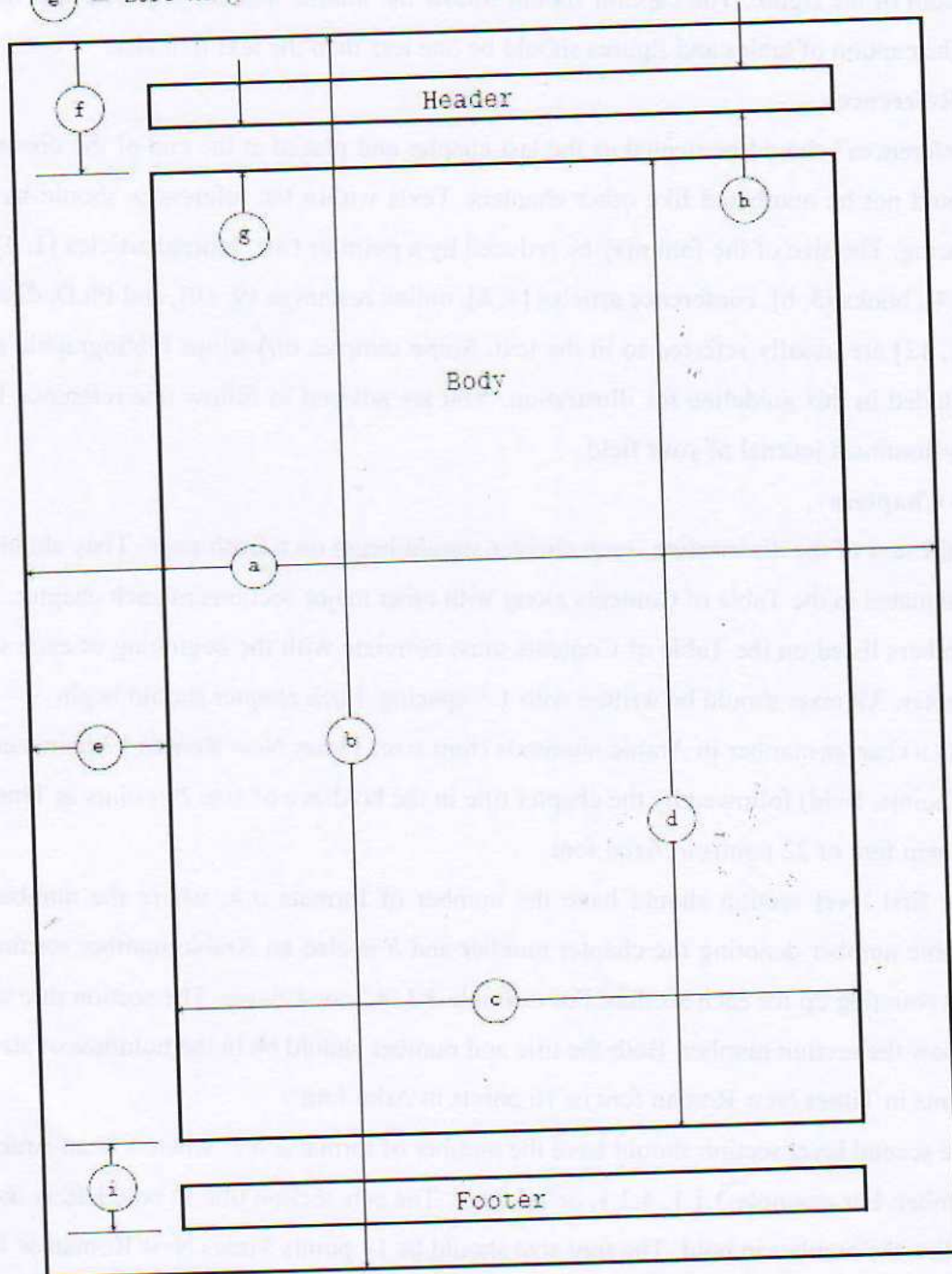


Fig. 2 Page size and Margin

g. Table and Figure

All tables, figures, and other such illustrations referenced in the text should be numbered for unique identification. The number format should be $p:q$ with p signifying the chapter number where the illustration appears and q denoting the serial number of that illustration in the chapter p . The serial number should be set to 1 at the beginning of a new chapter. A table caption should be placed at the top of the table, and a figure caption should be placed at the bottom of the figure. The caption should follow the unique number $p:q$. The size of the font in the caption of tables and figures should be one less than the text font size.

h. References

"References" should be treated as the last chapter and placed at the end of the dissertation. It should not be numbered like other chapters. Texts within the references should have single spacing. The size of the font may be reduced by a point or two. Journal articles [1, 2], Patents [3, 4], books [5, 6], conference articles [7, 8], online resources [9, 10], and Ph.D. dissertations [11, 12] are usually referred to in the text. Some samples of various bibliographic styles are included in this guideline for illustration. You are advised to follow one reference format of any dominant journal of your field

1.3 Chapters

In the text of the dissertation, each chapter should begin on a fresh page. They should also be designated in the Table of Contents along with other major sections of each chapter. The page numbers listed on the Table of Contents must correlate with the beginning of each section or chapter. All texts should be written with 1.5-spacing. Each chapter should begin with a chapter number in Arabic numerals (font size: Times New Roman 17 points or Arial 16 points, Bold) followed by the chapter title in the boldface of size 24 points in Times New Roman font or 22 points in Arial font.

The first level section should have the number of formats $a:b$, where the number a is an Arabic number denoting the chapter number and b is also an Arabic number starting from 1 and counting up for each section. For example 3.1, 4.2, or 1.5, etc. The section title should follow the section number. Both the title and number should be in the boldface of size 17 points in Times New Roman font or 16 points in Arial font.

The second level section should have the number of format $a:b:c$, where c is an Arabic number. For example 3.1.1, 4.2.1, or 1.5.2 etc. The sub-section title in bold letters should follow the number in bold. The font size should be 14 points Times New Roman or 13 points Arial. Except when it is commonly followed in your field, it is suggested not to give serial number beyond $a:b$ stage, i.e. serializing like $a:b:c$ is discouraged.

Dr. Shm Lh
01/11/22

Dr. Shm Lh
01/11/22 xxv

Dr. Shm Lh
01/11/2022

Dr. Shm Lh
01/11/22

The third level section should have no number. The sub-sub-section title should be in bold letters. The font size should be 12 points Times New Roman or 11 points Arial.

Kh. Zahid Ali
01/11/22

Kh. Zahid Ali
01/11/22 XXVI

Kh. Zahid Ali
01/11/22

Kh. Zahid Ali
01/11/22

Chapter 2

Some Unstructured Advice on Dissertation Writing

Outside the domain of physical formatting and layout, this document does not intend to foray into the contents of the dissertation to be written. That would influence content and stifle creativity. The following unstructured guidelines, however, may sometime prove useful to the students and their guides, who are looking for a good model.

2.1 Units

Appropriate use of style and convention for units are very much essential to ensure the scientific and technical communications not being inhibited by ambiguity. Authors may find the following points very useful.

- (a) Efforts should be made to use SI units where appropriate *e.g.* m, kg, s, K, A, V, Hz, N (Newton), J (Joule), W (Watt), Pa (Pascal), Tesla, *etc.* It is, however, sometimes more appropriate to use common metric units such as km, mm, μ m, nm, bar (pressure), mbar, MPa (Mega Pascal), $^{\circ}$ C, *etc.* Non-SI metric units should be preferred when SI units lead to very high (*e.g.* > 1000) or very low (*e.g.* < 0.01) figures. Common units should be used when dealing with direct experimental data.
- (b) Non-metric units *e.g.* lb, ft, inch, $^{\circ}$ F, esu, emu, psi should be religiously avoided. Often an instrument or a data source gives data in British units. That information should be converted to corresponding SI (or non-SI metric) units immediately on citation from the original text.
- (c) CGS units are sometimes appropriate depending on the field of work. But a conscious effort is to be made to translate them to corresponding SI units for example the unit g-mole or simply mole is common in chemistry, but chemical engineers should use kmol (for kilo-mole) and set Avogadro number to 6.023×10^{26} molecules per kmol instead of figure 6.022×10^{23} molecules/gmole. Units ESU and EMU may be avoided in all fields.
- (d) Certain scientific quantities have traditionally been associated with corresponding units, *e.g.* cm^{-1} for wave number, μ m, nm, Å for wavelength; do not convert them to SI. Between Å and nm, we should prefer nm except for wavelengths below 1 nm or 10 Å. Air conditioning temperatures should be expressed in $^{\circ}$ C and cryogenic temperature in Kelvin. Vacuum pressures should be recorded in millibar (mb) in preference to Torr.
- (e) Please note that all units start with lowercase letters except those named after scientists. For example, Watt (W), Joule (J), Kelvin (K), Ampere (A), and Volt (V) start with upper case

letters (W, J, K, A, V) while gramme (g), metre (m), second (s) start with lower case letters g, m, s. (f) kilo, mega, milli are represented by k, M, m respectively.

2.2 Significant figures

While reporting experimental or computational information, authors often use too short or excessively long numbers for the same quantity. Let us take an example. The area of a circle with radius of 1 cm may be reported as 3, 3.14, or 3.14159265 cm². All are correct, but only one is appropriate, depending on the context.

The value of π is 3.1415926536 _____. Depending on the control you or your instrument has set in the excel file, calculator or computer program you will get different results for the area of a circle for a given diameter. If your measured diameter is reported as 2.0 cm, it is certainly > 1.95 and < 2.05 cm. If it is reported as 2.000 cm, it is between 1.9995 and 2.0005 cm. The former measurement is from a very rough ruler, while the latter is from an extremely accurate instrument. The corresponding areas calculated should be reported as 3.14 and 3.1416 cm² respectively, bearing a little more precision than the original figures.

2.3 Grammar

Always ensure that your writing is based on correct grammar. Avoid very long sentences; but if you do use them, please mentally go through a process of analysis, ensuring proper division of the sentence to clauses and proper prepositions and conjunctions joining those clauses.

Articles (a, an, the) are frequently misused in Indian writing. The article “the” is usually over used. One simple test can correct many mistakes. We ask ourselves “Does the object in question appear first time in the text?” If the answer is “yes”, then use of “the” is most probably inappropriate. For example, the sentence “The bananas are yellow” is incorrect. But the sentences: “Barbie bought bananas from the market; the bananas were yellow” and “Ripe Bananas are yellow in eastern India” are correct.

2.4 Literature Review

The “Literature Review” is a very useful section of Indian theses. This section should cite most of the publications in the field including all related past work done. Several common mistakes found in recent theses from our country should be avoided.

Some theses reproduce, albeit using the author’s own language, a large amount of text book information. While for the sake of readability some basic ideas of the field may be articulated, it is certainly improper to reproduce large sections of textbooks. A reader is

[Signature]
01/11/22

[Signature]
01/11/2022

[Signature]
1/11/22

expected to have prior knowledge of the general field. Authors sometimes summarise articles in serial order but neither bring out the link between one article and its following one, nor bring out the relation between the article in question has with the main title of the thesis.

2.5 Materials and Methods

Experimental research in several research fields, particularly those dealing with material science, food technology, biotechnology *etc.*, invariably contain a chapter on "Materials and Methods" which describe the instruments and chemicals used in the experiments, plus the processing techniques. This chapter is usually irrelevant in theses in electrical sciences and those relying on mathematical analysis. Use the practice followed in dissertations of your field.

2.6 Completeness and Transparency

There is often an erroneous impression among research students that it is his duty, privilege and right to protect the intellectual property which he has so painstakingly produced. He sometimes makes a conscious effort to suppress details of his discoveries, but more frequently he does not care to put in all relevant details of his analysis, construction, or experiment in the thesis. A future reader trying to build up on the work of the author needs to reinvent all that the present author invented.

This goes against the philosophy of NIT Manipur and the scholastic spirit around the world. A thesis from NIT Manipur must contain all analyses and all steps of experimentation that have gone into the work so that an intelligent researcher anywhere in the world would find it useful to further his work.

Dr. J. S. Kh. Kh.
01/11/22

Dr. J. S. Kh. Kh.
01/11/22 xxix

Chandra Mohan
01/11/2022

Kh. Sachidul
1/11/22

Chapter 3

Conclusion


The conclusion is one of the most important chapters of the dissertation and often it is one of the most badly written chapters.

The student is expected to make a clear and concise statement of the original contributions made in the dissertation. The links between the key ideas spread across the chapters should be briefed in this chapter. Leave a positive impression on the examiner. One must remember not to claim those findings that have neither been proven nor corroborated in the dissertation.

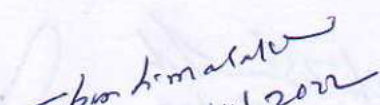
Scope for Further Research

This is not the end of the road. Narrate the way the research can be furthered.


01/11/22


01/11/22


01/11/22


01/11/2022

References

- [1] Shannon, C. E., 1948. "A mathematical theory of communication". *Bell System Technical Journal*, **27**(3), July, pp. 379 – 423.
- [2] Lowe, D., 2004. "Distinctive image features from scale-invariant keypoints". *International Journal of Computer Vision*, **60**(2), February, pp. 91 – 110.
- [3] Edison, T. A., 1892. Manufacture of carbon filaments, November. US Patent US485616A.
- [4] Droogenbroeck, M. V., and Barnich, O., 2010. Visual background extractor, August. US Patent US20100208998A1.
- [5] Jain, A. K., 1989. *Fundamentals of digital image processing*. Prentice-Hall of India.
- [6] Vapnik, V. N., 1995. *The nature of statistical learning theory*. Springer-Verlag, New York.
- [7] Toyama, K., Krumm, J., Brumitt, B., and Meyers, B., 1999. "Wallflower: Principles and practice of background maintenance". In Proceedings of International Conference on Computer Vision, ICCV - 1999, pp. 255 – 261.
- [8] Lin, M. C., and Canny, J. F., 1991. "A fast algorithm for incremental distance calculation". In International Conference on Robotics and Automation, ICRA - 1991, pp. 1008 – 1014.
- [9] NASA, 1964. Mariner 4, NSSDC ID: 1964-077A. National Space Science Data Center, <http://nssdc.gsfc.nasa.gov/nmc/spacecraftDisplay.do?id=1964-077A>.
- [10] Fielding, G., 2007. Digital ICE: Defect detection and correction using infrared-enabled scanners. Eastman Kodak Company, <http://www.motion.kodak.com/motion/hub/itp/dice/default.htm>.
- [11] Sutherland, I. E., 1963. "Sketchpad, a man-machine graphical communication system". PhD thesis, Massachusetts Institute of Technology, January.
- [12] Dhawan, S., 1951. "Direct measurements of skin friction". PhD thesis, California Institute of Technology, January.

Sh. Sh. Sh. Sh.
01/11/22

Sh. Sh. Sh. Sh.
01/11/22

xxxi

Chandrasekhar
01/11/2022

Sh. Sachin
1/11/22

Dissemination

Internationally indexed journals (*Web of Science, SCI, Scopus, etc.*) 1

- 1.
- 2.

Other journals and Book chapters 1

- 1.
- 2.

Conferences 1

- 1.
- 2.

Article under preparation 2

- 1.
- 2.

1 Articles already published, in the press, or formally accepted for publication.

2 Articles under review, communicated, or to be communicated.

Kh. Sh. Kh.
01/11/22

Kh. Sh. Kh.
01/11/22

xxxii

Kh. Sh. Kh.
01/11/22

Kh. Sh. Kh.
01/11/22

Index

abstract, 3
certificate
chapter, 4, 8
cover page, 1
doctoral, 1
formatting, 1, 8
margin, 5
originality, 3
black, 5
reference, 4, 7
template, 1, 8
acknowledgment, 3
examination, 1
compilation, 8
declaration of originality, 3
figure, 7
layout, 5
masters, 1
paper, 5
ink, 5
spacing, 5
title page, 1
bibliography, 4
supervisor, 2
contents, 3
dedication, 3
font, 7
logo, 5
name, 5
printing, 5
one side, 5
table, 7
undergraduate, 1

[Signature]
01/11/22

[Signature]
01/11/22

[Signature]
01/11/2022

[Signature]
1/11/22