

**GUIDELINES**  
**FOR THE PREPARATION OF**  
**Ph.D. Thesis**



**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY TIRUCHIRAPPALLI**  
**SETHURAPPATTI, TIRUCHIRAPPALLI- 620 012.**

**MM YYYY**

# THESIS

## The arrangement of parts of Ph.D. Thesis

The sequence in which the thesis material should be arranged and bound should be as follows:

1. Cover page
2. Inside cover page
3. Candidate's Declaration
4. Thesis certificate
5. Acknowledgement
6. Abstract
7. Table of Contents
8. List of Tables
9. List of Figures
10. List of Symbols, Abbreviations or Nomenclature (Optional)
11. Chapters
12. References
13. List of papers based on Thesis

The formats in various headings are given below

Cover page	See Annexure 1
Inside cover page	Same as Cover page
Candidate Declaration	See Annexure 2
Thesis Certificate	See Annexure 3
Abstract	See Annexure 4
Acknowledgement	Should not exceed two pages
Table of Contents	See Annexure 5
List of Tables	See Annexure 6
List of Figures	See Annexure 7
List of Symbols, Abbreviations or Nomenclature (Optional)	See Annexure 8
References	See Annexure 9

## GUIDELINES FOR PREPARATION OF THESIS

### FORMAT

The thesis manuscript has three basic parts: the preliminary pages, the text and the reference materials.

#### **Preliminaries**

The preliminary materials consist of the Title Page, Thesis Certificate, Abstract, Dedication (optional), Acknowledgement, Table of contents, List of tables, List of figures and other lists. Preliminary pages are paginated separately from the rest of the text. The title page is counted, but it is not numbered. Beginning with the page immediately following the title page, place page numbers in lowercase Roman numerals centered at the bottom of the preliminary pages. The Roman numerals are continued up to the first page of the text.

Proper Order of Preliminary Pages:

#### **1. Title Page**

The title of the thesis should be as concise as possible. It must occur consistently in every respect, including punctuation, capitalization, and hyphenation, on the abstract and approval forms. On the title page, the identical title must appear in all capital letters with each line centered on the page. The month in which the thesis is submitted, e.g., May, August, or January is to be printed at the bottom of the page. The title page is not numbered, but it is counted.

#### **2. Abstract**

The abstract should provide a succinct, descriptive account of the thesis. The abstract should not exceed 600 words, should be 1.5 line-spaced, and should adhere to the same style manual as the thesis manuscript. The abstract should include pertinent place names, names of persons, and other proper nouns. These are useful in automated retrieval. A lower-case Roman numeral is used on the abstract page.

#### **3. Dedication (optional)**

The dedication is brief, single-spaced, and centered on the page (horizontally and vertically). No heading is used. The word "To" customarily begins the dedication.

#### **4. Acknowledgement**

This section begins with the title ACKNOWLEDGEMENT centered in all capital letters. This page is used to thank those persons who have been instrumental to the student in completing the degree requirements. Acknowledgement of grants and special funding received to support the research also may be made on this page.

#### **5. Table of Contents**

The Table of Contents must include all chapter headings, the bibliography, and appendices. Entries are 1.5 lines spaced. The headings of major sections (i.e., chapters, bibliography, appendices) are written in all capital letters. Table of Contents headings must be identical to those in the text. Page numbers listed must be right-justified and connected to the appropriate entry by a line of evenly spaced dot leaders (periods). The words TABLE OF CONTENTS must be centered on the page two inches from the top of the first page only.

#### **6. List of Tables (if tables appear in document)**

The heading, LIST OF TABLES, appears centered on the page two inches from the top of the first page only. All table numbers and captions are listed exactly as they appear in the text.

#### **7. List of Figures (if figures appear in document)**

The heading, LIST OF FIGURES, appears centered on the page two inches from the top of the first page only. All figure numbers and captions are listed exactly as they appear in the text.

#### **8. Other Lists (nomenclature, definitions, glossary of terms, etc.)**

The appropriate title in all capital letters is centered two inches from the top of the first page only.

### **PAGE DIMENSIONS AND MARGIN**

The thesis should be prepared on good quality white paper preferably not lower than 80 gsm. Standard A4 size (210 mm X 297 mm) paper should be used for preparing the copies. The final thesis should have the following page margins:

Top edge : 25 mm  
Left side : 35 mm  
Bottom edge : 25 mm  
Right side : 30 mm

## **TYPE-SETTING, TEXT PROCESSING AND PRINTING**

The text shall be printed employing Laserjet or Inkjet printer, the text having been processed using a standard text processor. The standard font shall be Times New Roman of 12 pts with 1.5 line spacing. **The text must be printed on only one side of each page (except for chapters and References) and 1.5 lines spaced.**

### **Text**

The text must be divided into a logical scheme that is followed consistently throughout the document. The larger divisions and more important minor divisions are indicated by suitable, consistent headings. Chapter organization as practiced by the discipline should be followed. The student and the academic department are responsible for the quality and content of the text. Specific requirements for text presentation are given below.

### **1. Headings and Subheadings**

The student may use headings and subheadings to subdivide chapters or sections, but a consistent sequence of headings as identified in the style guide selected must be followed. The student may not change the sequence and style of headings from chapter to chapter. Once the sequence is chosen, it must be followed consistently throughout the thesis.

### **2. Pagination**

Lower-case Roman numerals are used to number all pages preceding the text. Although the preliminary paging begins with the title page, no number appears on that page. The page immediately following the title page is numbered with a lower-case Roman numeral. Beginning with the first page of the text, all pages are to be numbered with Arabic numerals consecutively throughout the thesis document, including the appendix and the bibliography or list of references. The Arabic numerals must be positioned at the bottom of the page, centered between the margins. Page headers or running heads may not be used in the thesis.

### **3. Tables and Figures**

The term "table" refers to a columnar arrangement of information, often data sets, organized to save space and convey relationships at a glance. The term "figure" refers to graphs, drawings, diagrams, charts, maps, or photographs. All such details should be inserted in the text near where they are first mentioned. A table or figure may appear on

the same page as the text that refers to it or on a separate page. Each figure or table must be numbered and have a caption. Captions are placed below figures and pictures and above tables. Captions may be single-or double-spaced of font size 11 with only bold letters for **Table 1**, **Figure 1**: and title will be normal letters without bold. Table can be called inside text as Table 1 and figure can be called as Fig.1.

#### **4. Illustrations**

Each illustration must be referred to in the text and it must be placed after, and as near as possible to, the first reference to it in the text. All illustrative materials in the thesis must be prepared on paper that is the same weight (or stronger) and use the same font type as elsewhere in the manuscript. If illustrations are mounted, dry mounting must be used. Illustrations may not be mounted with rubber cement, staples, mucilage, or photo-mounting corners. Illustrative material must be drawn or computer-generated in black. Material may be laser-printed or drawn in waterproof, permanent ink. Color will reproduce in microfilm as shades of grey. Color should be used only if it is essential to the thesis.

#### **5. Photographs**

It is recommended that the student use a high quality, high contrast copying machine to reproduce photographic material for submission in lieu of photographs. If original photographs are used, they should be printed on single-weight, fiber-based paper with a matte finish. All prints must be processed for nationally established standards for chemical permanence. Black-and-white prints are preferable. Photograph page number placement follows the standard pagination requirements.

#### **6. Appendix or Appendices**

The appendix (or a series of appendices) immediately follows the main text. The appendix includes material that may be helpful to the reader of the thesis but may be too long for inclusion in the text or footnotes. The title, APPENDIX, appears only on the first page of the section, in capital letters centered two inches from the top. Examples of such material include questionnaires, letters, original data, sample forms, and vitae. Reference should be made in the text to the inclusion of these materials in the Appendix. Each appendix is a separate subdivision of the text and must begin on a separate page. Each appendix must be listed in the Table of Contents. Appendices can be serially numbered A, B, C, etc.,

## ORGANISATION OF THE THESIS

The thesis shall be presented in a number of *chapters*, *starting* with introduction and ending with **Summary and Conclusions**. Each of the other chapters will have precise title reflecting the contents of the chapter. A chapter can be subdivided into *sections*, *sub-sections* and *sub-sub-section* so as to present the content discretely and with due emphasis. **Each chapter shall begin on a fresh page**

### 1. Chapter and Section format

The title of **Chapter 1** shall be **Introduction**. It shall justify and highlight the problem poser and define the topic and the aim and scope of the work presented in the thesis. It may also highlight the significant contributions from the investigation.

Use only Arabic Numerals. Chapter Numbering should be centered on the top of the page using large bold print.

Example:

## CHAPTER 1

### Sections

A chapter can be divided into **Sections, Sub-sections and Sub-sub-sections** so as to present different concepts separately. Sections and sub-sections can be numbered using decimal points, e.g., 2.2 for the second Section in Chapter 2 and 2.3.4 for the fourth Sub-section in third Section of Chapter 2. Use only Arabic Numerals with decimals. Section numbering should be left justified using large bold print.

Example:

#### 1.1 GENERAL

#### 1.2 ADSORPTION

### Sub Sections

Use only Arabic Numerals with two decimals. Sub section numbering should be left justified using large bold print.

Example:

#### 1.1.1 Adsorption Isotherms

#### 1.1.2 Langmuir Isotherms



## 2. Review of Literature

This shall normally be the **Chapter 2** and shall present a critical appraisal of the previous work published in the literature pertaining to the topic of the investigation. The extent and emphasis of the chapter shall depend on the nature of the investigation.

## 3. Results and Discussions

This shall form the penultimate chapter of the thesis and shall include a thorough evaluation of the investigation carried out and bring out the contributions from the study. The discussion shall logically lead to inferences and conclusions as well as scope for possible further future work.

### Table / Figure Format

As far as possible tables and figures should be presented in portrait style. Small size tables and figures (less than half of writing area of a page) should be incorporated within the text, while larger ones may be presented in separate pages. Tables and figures shall be numbered chapter-wise. For example, the fourth figure in Chapter 5 will bear the number

### Figure 5.4

Table number and title will be placed above the table while the figure number and caption will be located below the figure. Reference for Tables and Figures reproduced from elsewhere shall be cited in the last and separate line in the table and figure caption, e.g. (after McGregor [12]).

### Equations

All the equations should be typed in equation editor and should be properly numbered. For Example,

$$\text{Equation} \tag{2.1}$$

## 4. Summary and Conclusions

This will be the final chapter of the thesis. A brief report of the work carried out shall form the first part of the Chapter. Conclusions derived from the logical analysis presented in the Results and Discussions Chapter shall be presented and clearly enumerated, each point stated separately. Scope for future work should be stated lucidly in the last part of the Chapter.

## References

References should be listed according to the order of calling in chapters. In chapters, references can be mentioned as reference number inside square bracket like [1] or [1, 5] or [3 -6]. Reference format is given in Appendix 9.

***Please note: The Above is only a sample***

### **Binding**

The thesis shall be soft cover bound with the white edge soft binding.

### **Front Covers**

The front cover shall contain the following details:

- Full title of thesis in 18 point's size font properly centered and positioned at the top.
- Full name of the candidate in 14 point's size font properly centered at the middle of the page.

Size  
18 points (Bold Centre)

*Annexure 1*

# TITLE OF THE THESIS

**A THESIS**

*submitted by*

Size  
14 points (Bold)

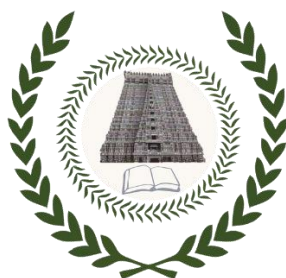
**NAME OF THE STUDENT**

*for the award of the degree*

*of*

Size  
14 points (Bold)

**DOCTOR OF PHILOSOPHY**



Size  
14 points (Bold)

**NAME OF THE DEPARTMENT**

**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY TIRUCHIRAPPALLI  
SETHURAPPATTI, TIRUCHIRAPPALLI- 620 012.**

**MM YYYY**

### **CANDIDATE'S DECLARATION**

This is to certify that the work presented in the thesis entitled **TITLE OF THE THESIS** is a bonafide work done by me under the supervision of ..... and was not submitted elsewhere for the award of any degree. I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea / data / fact / source in my submission. I understand that any violation of the above will be a cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Tiruchirappalli- 620 012.  
Date:

**(Name of the Candidate)**  
Roll No.....  
Name of Department  
Indian Institute of Information Technology  
Tiruchirappalli  
Tiruchirappalli – 620 012.

## **THESIS CERTIFICATE**

This is to certify that the thesis entitled **TITLE OF THE THESIS** submitted by **Name of the Candidate (Roll No.....)** to the Indian Institute of Information Technology Tiruchirappalli, for the award of the degree of **Doctor of Philosophy** is a bonafide record of research work carried out by him / her during the period .....to.....under my / our supervision. The contents of this thesis, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

Tiruchirappalli – 620 012.

Date:

**(Name of the Supervisor-1)**

Supervisor-1

Name of Department

Indian Institute of Information Technology

Tiruchirappalli

Tiruchirappalli – 620 012.

## **ABSTRACT**

Maximum of 800 words,  
Times New Roman,  
Font size – 12,  
1.5 line spacing  
should not exceed three pages

*Keywords:* maximum of 7 key words

**TABLE OF CONTENTS**

<b>Title</b>	<b>Page No.</b>
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1.2 OBJECTIVES.....	2
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 TITLE OF SUB SECTION. ....	3
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2.3 TITLE OF SUB SECTION .....	3
<b>CHAPTER 3 METHODOLOGY</b>	
3.1 TITLE OF SECTION .....	7
3.1.1 Title of sub section.....	7
3.1.2 Title of sub section.....	8
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<b>CHAPTER 4 RESULTS AND DISCUSSION</b>	
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5.3	SCOPE FOR FUTURE WORK .....	21
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## **LIST OF TABLES**

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**LIST OF FIGURES**

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2.1	Caption of Figure.....	4
2.2	Caption of Figure.....	5
2.3	Caption of Figure.....	6
2.4	Caption of Figure.....	6
3.1	Caption of Figure.....	7
3.2	Caption of Figure.....	7
3.3	Caption of Figure.....	8
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## ABBREVIATIONS

AI	Artificial Intelligence
AR	Autoregressive Model
ARMA	Autoregressive Moving Average Model
ARMAX	ARMA with external input
ARX	AR with external input
GA	Genetic Algorithm
PSO	Particle Swarm Optimization

## NOTATIONS

$K$	Specific substrate utilization rate constant
$k_d$	Microbial decay coefficient
$Q$	Rate of wastewater flow to the aeration tank
$q$	Specific substrate utilization rate
$Q_e$	Effluent flow rate
$q_m$	Maximum specific substrate utilization rate
$R$	Recirculation ratio
$S$	Residual growth limiting substrate concentration
$X$	Biomass concentration in the Aeration tank

## References

### 1. Papers with Single Author,

J. Quackenbush, "Microarray data normalization and transformation," *Nat Genet*, vol. 32, no. 4, pp. 496–501, 2002, doi: 10.1038/ng1032.

### 2. For papers by Two Authors,

Z. M. Hira and D. F. Gillies, "A review of feature selection and feature extraction methods applied on microarray data," *Adv Bioinformatics*, vol. 2015, 2015, doi: 10.1155/2015/198363.

### 3. For papers by more than two Author,

D. Hongbin, L. Tao, D. Rui, and S. Jing, "A novel hybrid genetic algorithm with granular information for feature selection and optimization," *Appl Soft Comput*, vol. 65, pp. 33–46, 2018.

### 4. For Conference

J. Usefi and A. Rahimipour, "A Comparative Study of Feature Selection Methods in Genomic Datasets," 2019 IEEE 32nd International Symposium on Computer-Based Medical Systems (CBMS), Cordoba, Spain, pp., in 2019 IEEE 32nd International Symposium on Computer-Based Medical Systems (CBMS), Cordoba, Spain, 2019, pp. 471–476.

### 5. For Book chapters

W. E. Kelly, B. Luke, and R. N. Wright, *Engineering for Sustainable Communities: Principles and Practices*. Reston: American Society of Civil Engineers, 2017. Accessed: Apr. 2, 2018. [Online]. doi: 10.1061/9780784414811

**QUICK REFERENCE**

**PAGE DIMENSIONS AND MARGIN**

Paper size : 80 gsm. Standard A4 size (210 mm X 297 mm)

**Margins**

Top edge : 25 mm

Left side : 35 mm

Bottom edge : 25 mm

Right side : 30 mm

Print out : Laserjet or Inkjet printer

<b>Sl. No.</b>	<b>Particulars</b>	<b>Type of Printing</b>
1	Chapters References Appendix	One side print
2	Cover page Inside cover page Candidate Declaration Thesis Certificate Abstract Acknowledgement Table of Contents List of Tables List of Figures List of Symbols Abbreviations or Nomenclature (Optional) List of papers based on Thesis	One side print

Font size (regular Text) : Times New Roman of 12 pts

Spacing : 1.5 line spacing

Heading : 1. Chapters: 14 pts bold Centre aligned (Capital Letters)  
2. Sections: 12 pts bold left aligned (Capital Letters)  
3. Subsections : 12 pts bold left aligned (Title case)

Page numbers (Chapters) : Bottom – centered – 12 pts / Arabic numbers (1, 2, 3...)

Page numbers (Preliminaries): Bottom – centered – 12 pts / Roman numbers (i, ii, iii....)

Binding : Soft binding (with white strip)