

# THESIS MANUAL FOR THE M.TECH. PROGRAM

**Indian Institute of Technology Patna**

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## Chapter 1

### **Guidelines for Preparing and Submitting M. Tech. Thesis**

#### **1.1. General Instructions**

1. The thesis must be printed on A4-size paper for distribution. The total number of pages of the thesis should not exceed 60-70 pages. This excludes the title page.
2. Hardcopy of the thesis must be submitted to the department at least a week prior to the probable date of examination. Softcopy and Hardcopy both are to be sent to the external examiner as well as the examiner internals within the same time frame.
3. After incorporating the suggestions made by the examiners on the day of examination, a copy of the modified thesis must be submitted with a certification from the advisor. This final copy of the thesis must be submitted to CET OFFICE through the M. Tech. program Coordinator/Advisor. A soft copy of the thesis must also be submitted on moodle portal along with the hard copy of the thesis.

#### **1.2. Title of the Thesis and Title page format**

1. The title of a thesis should be a meaningful and a concise description of the research done by the student.
2. The title should be short (word limit - 10-15 words, in no case exceeding 20 words) and typed in block letters (All Caps). If title is longer than four inches, then title should be arranged in an inverted pyramid with double line spacing.
3. Formatting:

Font style	: Times New Roman/Arial
Font size	: As indicated in sample page
Margin	: 1.5 inches (from top, bottom, left and right)
Justification	: Centre

4. Thesis title should not contain symbols (including Greek symbols such as  $\pi$ ,  $\alpha$ , etc.), initials, formulas (including chemical formulas), subscripts, superscripts, numerical characters, acronyms or even abbreviations in brackets. Redundant words, such as "An investigation of .....", "A Study of .....", "Theory of ....", "Some ....", "An Experimental Investigation of ...", and "Toward a ....", should be avoided.

#### Examples

"The Effects of Ion Implantation and Annealing on the Properties of GeSi<sub>2</sub> Films on Silicon Wafer Substrates" should be written as "The Effects of Ion Implantation and Annealing on the Properties of Germanium Silicide Films on Silicon Wafer Substrates."

"TEM" should be written as "Transmission Electron Microscopy" and should not be written as "Transmission Electron Microscopy (TEM)."

### **1.3. Statement of Thesis Approval Page:**

This page indicates that thesis has been approved by all DPPC members, who sign above their full legal name. The template for this is available in subsequent pages (pg – 5).

INDIAN INSTITUTE OF TECHNOLOGY PATNA

**Evaluation Committee Approval**

of a Thesis submitted by

Name of the student (in All CAPS)

The thesis of \_\_\_\_\_ has been read, found satisfactory and approved by the following DPPC committee members.

Name : 1 \_\_\_\_\_, Supervisor      Date : \_\_\_\_\_

Name : 2 \_\_\_\_\_, Co-Supervisor      Date : \_\_\_\_\_

Name : 3 \_\_\_\_\_, Member      Date : \_\_\_\_\_

Name : 4 \_\_\_\_\_, Member      Date : \_\_\_\_\_

Name : 5 \_\_\_\_\_, Member      Date : \_\_\_\_\_

Name : 6 \_\_\_\_\_, Member      Date : \_\_\_\_\_

Name : 7 \_\_\_\_\_, Member      Date : \_\_\_\_\_

## **1.4. Body of the Thesis**

The student is responsible for the way the text is organized. However, it should have title of all sections (e.g. Introduction, Review of Literature, Objectives and Scope, Results, Discussion of result, Conclusion, Contributions made by the scholar, and References) in capital letters and center justified. The text (in each section) begins after a triple space.

If the thesis contains text that is a reprint of a previously published report, a credit line “Reprinted with permission from” followed by source must be placed on the page.

Use MS Word Times New Roman/Arial (or [LaTeX](#)) with font size 12 and 1.5 line spacing for the text.

### **1.4.1. References**

Use number reference citation system where numbers in the text are in superscript only. If several references are cited at once, then numbers are separated by comma. If reference number is to be mentioned at the end of a sentence, then the superscript number is placed outside the punctuation marks.

e.g. Many researchers<sup>6, 7, 11-19</sup> disagree with the conclusions drawn by Feynman.<sup>20</sup>

The reference list is compiled (under reference section) in numerical order. No spacing between lines within a particular entry is present. However, a double space separates two references.

## **1.5. Tables and Figures**

When data are compiled in rows and columns, these are referred to as a “Table”. Tables should be used only when absolutely necessary. Figures include the diagrams, schemes (including chemical reactions), photos, maps, plots or other schematic/graphical representation.

The guideline for ordering, placement, numbering and assigning title (for tables) or caption (for figures) is same as that mentioned in the same as that for thesis. For reference, please consult the “Guidelines on the Preparation of a Thesis”.

### **1.5.1. Order of Tables and Figures**

Tables and figures also must be referenced in order (i.e., Table 1, Table 2, Table 3, not Table 1, Table 3, Table 2). It is not acceptable to refer to Table 3 in the text before referring to Table 2. However, once a table has been referred to in the main text, it can

be mentioned again out of its sequential order. Each figure or table appears only once and cannot be repeated.

### **1.5.2. Table and Figure Placement**

A large table or figure is placed by itself on the page, centered within the thesis margins. Although it is not necessary for large tables or figures to be centered precisely between the top and bottom margins of the page, tables and figures should be placed so that they look balanced on the page. Full-page tables or figures must be placed on the page immediately following the textual reference. Other guidelines pertaining to placement of tables and figures are same as that mentioned for writing the thesis manuscript (refer to pg 34 of this document).

## **1.6. Page Numbering**

The title page should not have a number printed on it. The page next to the title page should bear the page number 1. Page numbers should be printed centered at the bottom of each page.

## **1.7. Tips for Good Writing**

### **1.7.1. Continuity of Ideas**

It is very important that there is a continuity of idea in your thesis. Few suggestions in this regard are mentioned below:

A particular paragraph should elaborate only one theme/idea. If there is a need to emphasize multiple themes, then it is suggested to name them in a single paragraph and subsequently discuss them in separate paragraphs.

There should be a smooth transition from one paragraph to the next paragraph. In order to do so, the first paragraph mentions the theme of the next paragraph.

### **1.7.2. Proper Usage of Verbs and Tenses**

In order to have continuity, it is essential to use verb tenses judiciously and properly. Following suggestions may be useful in this context:



- a. Past tense (e.g., "Bergman showed ... ") or present tense (e.g., "Newton has shown . . .") is appropriate for the literature review. This usage of verb tense may be applied for discussion on the past events.
- b. Results are best described by using past tense. e.g., "Expenditure increased at the rate of 10% per year.").
- c. Inorder to discuss results and draw conclusions, it is apt to use present tense. e.g., "The results of the experiment indicate ..."

### 1.7.3. Mathematical Symbols

Mathematical expressions must italicize all symbols used in them. A distinct look (to the mathematical expression) may be imparted by separating them from the text (both preceding and following it) by larger line spacing and an indentation should be given. Each equation must appear only after it has been referenced in the text.

### 1.7.4. Units of Measurement

Always use International System of Units (SI) units. Follow the guidelines given below while using the SI units

- Symbols for units do not have an appended period/full stop (.) unless they appear at the end of a sentence. e.g., The length of the cube is 500 m and the breadth is only 0.01 m.
- Symbols for units are written in upright Roman type (m for meter, g for gram), so as to differentiate them from the italic type used for mathematical variables (*m* for mass, *g* for acceleration due to gravity).
- Symbols for units are generally written in lower case, except for symbols derived from the name of a person. e.g., the SI unit of frequency is named after Heinrich Hertz, so its symbol is "Hz" whereas its unit is "Hertz". Another common example is SI unit of measurement for temperature - Kelvin named after Lord Kelvin. It is denoted by unit symbol K. Other exceptions include petametre ( $10^{15}$  m; symbol = Pm) where the symbol has the first alphabet in upper case to differentiate it from picometre ( $10^{-12}$  m; symbol = pm).
- The SI rule for pluralizing units is that symbols of units are not pluralized, for example "600 kg" (not "600 kgs").

- The number and the symbol of the SI unit are separated by a space (e.g., "32.451 kg", "9.3x10<sup>4</sup> m<sup>3</sup>", "22 K"). Some notable exceptions are the symbols for plane angular degrees, minutes and seconds (°, ', and "), which are placed immediately after the number with no intervening space.
- Spaces (or commas) may be used as a thousands separator (*1 000 000* or *1,000,000*). Spaces are preferred to avoid confusion resulting from the different convention used in different countries.
- Symbols for derived units that are obtained from multiple units by multiplication are joined with a space or center dot (·) (e.g. "N m" or "N·m ").
- Symbols for derived units obtained by division of two units are joined with a solidus (/), or given as a negative exponent. For example, the "meter per second" can be written "m/s", "m s<sup>-1</sup>", or "m·s<sup>-1</sup>". A solidus should not be used if the result is ambiguous, i.e. "kg·m<sup>-1</sup>·s<sup>-2</sup>" is preferred to "kg/m·s<sup>2</sup>" to avoid misinterpretation.

Many units in everyday and scientific use are not derived from the seven SI base units (meter, kilogram, second, ampere, Kelvin, mole, and candela). Some examples which can be used are as follows:

- Many units of time — minute (min), hour (h), day (d) — in use, besides the SI unit "second" are specifically accepted for usage.
- The "year" is specifically not included in SI units, but its use is accepted.
- Electrical energy is often billed in kilowatt-hours instead of megajoules.
- The nautical mile and knot (nautical mile per hour) are used to measure travel distance and speed of ships and aircraft. In addition to these, convention on International Civil Aviation permits the "temporary use" of foot for altitude.
- Astronomical distances are measured in astronomical units, parsecs (an abbreviated form of a **par**allax of one **sec**ond; symbol: pc), and light-years (symbol: ly) instead of, say, petametres (1 petametre = 10<sup>15</sup> m; symbol = Pm).
- Atomic scale units used in Science and Engineering are: ångström, electronvolt, atomic mass unit, and barn.
- A sphygmomanometer measures and reports blood pressure in in mmHg instead of Pa.

**See the following website for details of Rules and style conventions, as far as SI Units are concerned.**

<http://physics.nist.gov/cuu/Units/rules.html>

### ***Indian Units of Measurement***

"Lakh or Lac" is not understood by many non-Indian examiners. There are two ways to deal with this problem. Avoid using it; instead express it as 1 00 000.

Example: The sentence "The car was sold to 5 lakh persons last year" could be written instead as "The car was sold to 5 00 000 persons last year".

Alternatively, when "Lakh/Lac" is used for the first time, explain its equivalence to "1 00 000" in a footnote.

### **1.7.5. A Sample of Common Mistakes**

Some words and expressions, commonly misspelled by the scholars, are the following:

<b><u>Correct</u></b>	<b><u>Incorrect</u></b>	
et al.	etal, et. al, et al	(The word is "et alia")
whereas	where as	
Literature	Literatures	
Equipment	Equipments	
kWh	KWH, KWh	(K stands for Kelvin.)
million tons ( $10^6$ )	MT	(M stands for Mega.)
10 kg	10kg	(A space separates the value from the unit of measurement.)

### **1.7.6. Common Errors in Writing**

Writing a dissertation could be tiring process. This may lead to loss of attention that may lead you to common errors in writing. The following write up gives you an idea about some of these common errors. Keeping them in mind will make your work impressive.

In most writing, common mistakes include:

- (1) Incorrect use of punctuation, including commas, semicolons, colons, and dashes, etc.

- (2) Misusing articles and prepositions
- (3) Mistaking one word for another (envelope and envelop, stationary and stationery, affect and effect, complement and compliment). The spell-checker won't detect these errors.
- (4) You may want to keep your sentences small.
- (5) Confusing "then" and "than," "its" and "it's," "affect" and "effect," and "lay" and "lie"
- (6) Advice versus Advise:
- Advice is a noun, something that you give. It is a thing. Say, "Please give me some advice."
- Advise is a verb, something that you do. It is some action. Say, "Please advise me."
- (7) Affect and Effect:
- (8) As verbs, they differ. To affect some thing is to have some influence upon it. To effect some action is to cause it to happen. As nouns, they also differ. Affect is like affection, related to emotion. Effect is a result.
- (9) Apart and a Part:
- One is a single word; the other includes two words. "Apart" means two things are separate or away from each other. A "part" means one thing is a portion or an element of another.
- A wall is usually seen as a "part" of a house, for example, while a fence is seen as "apart" from the house.
- (10) Complement and Compliment:
- The change from an "e" to an "i" makes a big difference in these two words. The word "complement" is related to the word "complete." If one thing complements another, then the two together make a whole.
- In contrast, the word "compliment" is an observation of some good quality in a person. It is considered more sincere than flattery.
- (11) In Spite: There is no such word as "inspite." Make sure you use the two words separately, "in" and "spite."
- (12) Isn't it?
- When you make a statement, then immediately ask if it is not true, you can use "isn't it" only if the question used the verb "to be" (ie "is" or one of its forms),

the original question was positive, and if the subject of the sentence is third person singular (it). It is correct to say, for example, "It is coming, isn't it?"

(13) Loose and Lose: The two words, "loose" and "lose," look similar, especially to those who speak English as a second language. It is easy to mix them up. The word, "loose," means something is not tight or securely fastened down. It might easily fall apart or fall off. The word "lose," in contrast, means to have something go away and become lost.

(14) Passive Voice: Using the passive voice is a common way to say less than people want to read or hear. In the passive voice you say, "The orange was eaten." That way you hide the subject and so do not reveal who ate the orange. If you use the active voice, you must reveal the subject. "Aziz ate the orange." The active voice is simpler, and it always identifies the subject, i.e. who did the action. Nothing is hidden.

Always use the active voice in writing an academic paper or dissertation.

(This is compiled from various sources).

## **1.8. The Overriding Rule**

The text in the thesis should be clear in its meaning. To ensure the clarity of presentation, the best method is to ask your friend, who is not in your area of work, to read through your thesis. If he ( or she) is confused with your writing, it means that the sentence/paragraph/ should be rewritten for clarity.

## **CHAPTER 2**

### **General Information and Institute Regulations**

This handbook is prepared by Indian Institute of Technology Patna to aid the students in writing M. Tech. thesis. This handbook must be used in conjunction with the student's department for references, figure and table format and other stylistic considerations. It is the student's responsibility to be familiar with the rules and regulations governing thesis submission and subsequent requirements for graduation. The following is a general outline for preparing a thesis for approval by the student's department and the Institute.

#### **2.1. Objectives**

For all M. Tech. students, completing a research thesis is a mandatory requirement.

A thesis is documentation of a research of a student- a record of the original research done by the student during his M. Tech. program. It provides information on the student's research work to future researchers. The Institute is committed to preserve a paper copy of the student's thesis for archiving and cataloging it in the central library, making it available to others for academic purposes.

The objective of this document is to provide a set of guidelines for research students to prepare a thesis to satisfy the above mentioned criteria for M. Tech. research.

#### **2.2. Features**

The main criteria for M. Tech. research is that it should provide a useful educational experience for the student emphasizing creativity, independent action and learning, research methodology, and scholarly approach. The research should possess the major characteristics of the scientific method, namely objectivity and reproducibility. Assumptions should be clearly stated in both experimental and theoretical research. The thesis should reflect a level of competence indicative of significant achievement beyond the master's level. Thus, the research is expected to draw directly upon

advanced learning in the student's major field and demonstrate mastery of that knowledge.

### **2.3. Institute Regulations**

Guidelines for “*Evaluation of M. Tech. Project/Thesis*” is mentioned in M. Tech. ordinance of IIT Patna.

### **2.4. Topic approval**

The advisor approves the topic/title of the thesis.

### **2.5. Publication of thesis involving Publication, Patents and restricted data**

Written permission (hardcopy, facsimile or electronically signed) has to be obtained from Journal for reproducing data published in the journal. An article or articles that are accepted by journals but have not yet been published may be used as part of a thesis or dissertation. The student should check with the specific journals if there is any requirement regarding obtaining permission for such unpublished yet accepted manuscripts. In case of sponsored projects, funding agency has to be mentioned and the data usage should be in accordance with the guidelines of the funding agency. Data from patents can be incorporated in thesis only after relevant permission and adherence to the patent guidelines.

### **2.6. Approval requirement**

The student has to make sure whether all requirements have been fulfilled as mentioned in the Ordinance.

### **2.7. Copyright**

Copyright protection is obtained by placing notice of copyright on the thesis . The copyright notice should be placed in the Thesis Title page and no separate page is required. The copyright notice shall consist of the following:

- a. The encircled symbol “C” ©
- b. The year of the award of the degree
- c. The name of the owner of the copyright
- d. The words “ All rights reserved”

Example

Copyright © Your Name 2011  
All Rights Reserved

## **2.8. Avoiding infringement**

Obtaining permission to quote copyrighted material is Government law. Students should obtain written permission (hard copy, facsimile, or electronic signature) for any figure or table in its entirety. Students should also use the credit line specified by the copyright owner and place it where required by the owner.

All sources must be cited whenever use is made of the material of others, even if the use is limited and no copyright permission is necessary. Direct use of the work of others without citing the source is plagiarism considered as a severe academic offence.

## **2.9. Citation of Web-accessed Information**

Web citations must include name of author, title of publication, and date of publication. These items are formatted according to the style guide selected. In addition, the Uniform Resource Locator (URL) must be provided in the following form:

- protocol or access-mode identifier (i.e., http, https), followed by a colon and two forward slashes (e.g., http://)
- host name, always typed in lower case (e.g., <http://www.ieee.org/>)
- pathway to the document, including file name, typed exactly as it appears, including upper and lower case and punctuation
- A sample URL is: <http://www.ieee.org/Policy/Submis/Abstract/pabs587.cfm>

URLs may be broken only after a slash or double slash or after a period. Never insert a hyphen, and never break a URL at a hyphen.



## **Chapter 3**

### **Content and Organization of Thesis Text**

Proper organization of the thesis is extremely important that enable the readers to view and understand the contents of the thesis. In this chapter, each component of the thesis is listed to help the students in organizing their thesis properly.

#### **3.1. Thesis size**

A thesis should not exceed 60-70 pages (excluding prefacing material of the thesis). Some tips to reduce the size of a thesis are given below.

- a. Do not unnecessarily repeat definitions and texts.
- b. Proper referencing may save writing details of literature surveyed.
- c. Be precise in your description, conclusions and interpretations.
- d. Do not leave blank space on a page after a table or a figure.
- e. Students might consider including a CD for details computer program listing and just include the flow of the logic and its other distinguishing features in the text of the thesis.

#### **3.2. Paper Quality**

The copy of the thesis to be submitted to the central library should be durable. To ensure durability, paper should be acid neutral or acid-free as mentioned in the packet. Thesis-quality paper (Acid free Bond Paper) is available in the market and typically weighs greater than 85 GSM (gram per square meter).

#### **3.3. Paper size**

The standard size of paper of a thesis is 21.5 cm (8.5 inches) wide and 28 (11 inches) long, commonly known as A4 sized paper.

Oversized figures and tables if any should be reduced appropriately to fit with the size of the paper. Care should be taken not to compromise the clarity of the contents while reducing. If required, you may consider folding oversized papers to fit with the thesis size.

### **3.4. Double-sided printing**

The copies of the thesis at the time of submission should be printed double sided. The final copy of the thesis to be submitted to the central library only may be either single sided or double sided. In case of double sided printing, care must be taken to choose paper quality so as to ensure opaqueness of the paper and good readability under normal lighting conditions.

In a double sided thesis, new chapters always starts on an odd numbered page. If a chapter ends on an odd numbered page, the next even numbered page is to be kept blank to ensure start of the next chapter on an odd numbered page.

### **3.5. Non paper material**

Digital or magnetic materials, such as CDs and DVDs, may be included in the thesis as a supporting material. They have to be given in closed packet in the back cover page of the thesis. Proper label should be given to non paper material that should include name of student, date of submission and copyright notice. However, preservation and use of such material is not guaranteed from the central Library, since rapid technology changes may render the format obsolete.

Students can also include important samples they have produced, e.g., Polymer films and others provided they are non toxic and clearly labelled and packeted at the back cover page.

### **3.6. Page numbering**

Page numbers for the prefacing materials of the thesis should be in Roman numerals and should be centered or right cornered at the bottom of the pages.

Page numbers of the body of the thesis should be in Arabic numerals and start with the page of Chapter 1. It should continue throughout the thesis and same trend of centering or right cornering the numbers as the Roman numerals be followed.

In double sided thesis, the odd numbered pages are always on the right and even numbered pages are on the left.

### **3.7. Binding**

Initial copies of the thesis submitted for examination have to be softbound and printed on both sides. Final copies of the thesis, after incorporating the changes, corrections and modifications suggested by the doctoral committee members, have to be hardbound and preferably printed on one side.

### **3.8. Font**

Preferred font size of normal text in the thesis is 12 point. However, minimum acceptable font size of material within a table/figure/pictorial representation is 8 point. The font type should be Times New Roman or Arial.

### **3.9. Margins**

A margin of 3.75 cm (1.5 inch) is to be given on the binding edge while on the other side it is to be 2.5 cm (1inch). The text of the thesis, including headings, figures, tables, and notes, but excluding page numbers, must be accommodated within the page area.

### **3.10. Line Spacing**

The line spacing in the main text should be one and a half (1.5). Single line spacing should be given for abstract, declaration, thesis approval, figure captions, table titles, figure legends, foot notes and references.

Two consecutive paragraphs should either be separated by spacing larger than the line spacing adopted for the text or the paragraph is started with an initial tab space.

### **3.11. Equations**

Format of equations is dictated by the style guide the student is following. Short equations are centered within the thesis margins. All equations are set off from preceding and following text by a triple space. Spacing must be uniform and consistent. In general, equations should be numbered at the right margin of the thesis

manuscript with the number either in brackets or parentheses. Equations may be numbered consecutively or locally. If figures and tables are numbered locally, equations also must be numbered locally. If they are locally numbered, the main divisions of the manuscript must be numbered with Arabic numerals. Local numbering of equations never exceeds one decimal place (i.e., equations are never numbered according to the number assigned to a subheading). Equation numbers must be aligned with each other throughout the manuscript.

### **3.12. Headers and Footers**

Headers and footers may be used to provide chapter name/number or any other relevant information. However, author should be consistent in the use of header/footers throughout the entire thesis.

### **3.13. The Appendix or Appendices**

If used, an appendix follows the text but precedes the references or bibliography. The pages of the appendix are numbered consecutively with the rest of the text. There is considerable flexibility in the kind of material that may be placed in appendices: computer programs, tables of raw data, questionnaires, letters, original historical source material, etc. Each appendix should be sequenced with upper-case letters of the alphabet (APPENDIX A, APPENDIX B). If there is only one appendix, no letter is used; one appendix may or may not have an explanatory title. If there is more than one appendix, each has an explanatory title. The appendix title(s) must be listed in the table of contents in all upper-case letters. Subheadings in an appendix, however, are not listed in the table of contents. Subheads in an appendix follow the same subhead scheme selected for the text.

## **Chapter 4**

### **Thesis Template: Documentation and Writing Style**

#### **4.1. ABOUT THE DOCUMENT THAT FOLLOWS**

This “template” is a very basic “starter kit” for formatting your thesis in Microsoft WORD. It does not incorporate WORD’s Autogenerate capability for the Table of Contents, List of Tables, Figures etc.

It has the margins and page numbering set up, the formatting of the front pages (often the area with the greatest number of formatting errors) correctly set up, chapter and section headings in acceptable formats and heading and subheading styles set up through subheading level 4.

It also offers some tips, usually in [blue text boxes](#) that can be easily deleted before you print. **IMPORTANT:** you must be in the Page Layout View (under the View menu) to see or delete these [blue text boxes](#) (also called “help boxes” or “instructional text boxes” herein).

It is our intention to develop a template that allows the user to take advantage of WORD’s auto-generation of Table of Contents, Lists of Tables and Figures, etc.

[THESIS TITLE GOES HERE]

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A Thesis  
Presented to  
The Academic Faculty

by

[Student Name Goes Here]

In Partial Fulfillment  
of the Requirements for the M. Tech. Degree



**Indian Institute of Technology Patna**  
[MONTH YEAR of VIVA VOCE]

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[To my beloved parents]

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## ACKNOWLEDGEMENTS

[Start typing here.] I wish to thank Dr. Issac Newton, my supervisor, for his invaluable guidance and support. I would also like to thank .....[Delete this paragraph.]

Acknowledgements must be written in complete sentences and in the third person. i.e. not “Thanks, Mom and Dad!” but “I would like to especially thank my mother and father, without whose guidance and support I would not be here.”

The Acknowledgements page is the first page to bear a printed page number (in Roman) and be listed in the Table of Contents.

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## **Certificate**

This is to certify that the thesis entitled “THE TITLE OF THE THESIS”, submitted by NAME OF THE STUDENT to Indian Institute of Technology Patna, is a record of bonafide research work under my (our) supervision and I (we) consider it worthy of consideration for the degree of Master of Technology of this Institute. This work or a part has not been submitted to any university/institution for the award of degree/diploma. The thesis is free from plagiarized material.

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Supervisor

Date: \_\_\_\_\_

## **Declaration**

I certify that

- a. The work contained in this thesis is original and has been done by myself under the general supervision of my supervisor/s.
- b. The work has not been submitted to any other Institute for degree or diploma.
- c. I have followed the Institute norms and guidelines and abide by the regulation as given in the Ethical Code of Conduct of the Institute.
- d. Whenever I have used materials (data, theory and text) 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 reference section.
- e. The thesis document has been thoroughly checked to exclude plagiarism.

Signature of the Student

Roll No:

## TABLE OF CONTENTS

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### CHAPTERS

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[Click here and type Subheading]	#

This TABLE OF CONTENTS IS SET FOR YOU TO MANUALLY INPUT YOUR INFORMATION. If you need more chapters or subheadings in any chapter, simply go on adding keeping the source formatting same.

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3 [Click here and type CHAPTER 3 TITLE]	#
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Table 2.2: [Click here and type table title.]	#
Table A.1: [Click here and type table title.]	#
Table A.2: [Click here and type table title.]	#
Table B.1: [Click here and type table title.]	#

### A Note on Table and Figure Numbering

Tables and figures numbers should restart every chapter, in which the numbering takes the form “chapter number.table number”, e.g. Table 2.1, 2.2, 3.1, 4.1...4.16. In the latter case, table in appendices will be numbered “appendix letter.tablenumber”, e.g. Table A.1, A.2, B1, C.1...C.16.

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Figure 2.1: [Click here and type figure title.] #

Figure 2.2: [Click here and type figure title.] #

Figure A.1: [Click here and type figure title.] #

### A Note on Table and Figure Numbering

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## LIST OF SYMBOLS AND ABBREVIATIONS

Symbol-1	What it means
Symbol-2	What it means
Abbrev1	What it means
Abbrev2	What it means

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If you have a full page or more of either Symbols or Abbreviations, they should be broken into separate lists, i.e. a LIST OF SYMBOLS and a LIST OF ABBREVIATIONS.

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Abstract should contain your name and your supervisor/s name at the bottom.

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# **CHAPTER 1**

## **INTRODUCTION**

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### **1.1. Replace this Text with Yours [This is a First-Level Subheading]**

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#### **Things to be Careful of**

- Figure and Table numbering
- Numbering of references (superscript, Arabic numerals and in order)

## CHAPTER 2

### TITLE OF THE CHAPTER GOES HERE

How do you begin a new chapter using this template? What must you do to get the page numbers to act correctly? Below are the steps for making a new chapter.

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To move to a new chapter, you must tell MS Word that you are moving on to a new page. You do this by inserting a page break. A page break forces the next line of text to appear at the top of a fresh page.

##### **2.1.1. How to Insert a Page Break [This is a Second-Level Subheading]**

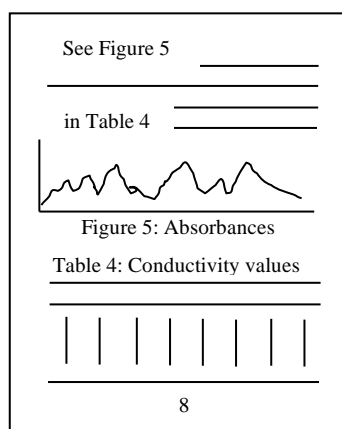
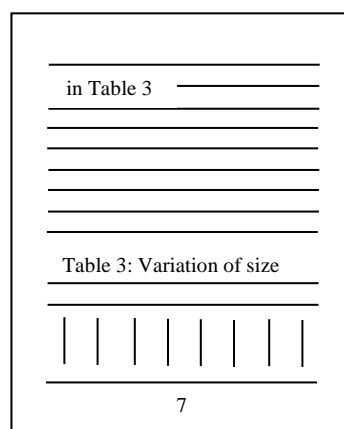
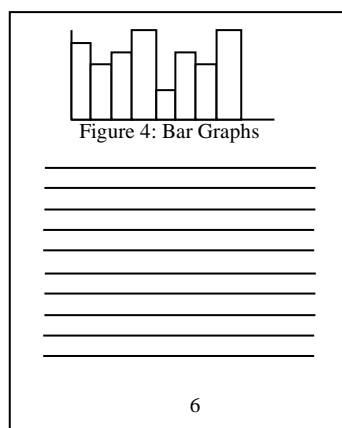
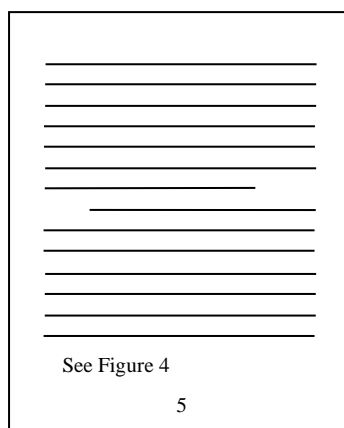
1. Go to the end of a chapter. That means put your cursor after the very last character of that chapter.
2. Hit **Return** to move to a new paragraph.
3. From the **Insert** menu, choose **Break**. Click the button **Page Break**, and click **OK**.

If you are in Normal View (see View menu), you'll see a dotted line across the screen. That marks the end of the previous page. If you are in Page Layout view, you'll just see the top of a new blank page.

Begin typing. If you are in Page Layout view, when you get to the end of the first page, your text will skip to the next page. A page number will appear at the bottom center of the new page. The number will be gray, and you can't edit it. That's OK; that is the way it's supposed to look on the screen.

## Figure and table Placement

It is highly recommended that figures and tables be placed in the same page as much as practicable wherever they are mentioned in the text for the first time. Tables and figures may be landscaped or placed broadside. For a landscaped table or figure, the title or caption is also landscaped the title or caption is on the same page as the table or figure. Few examples are shown below.



## Style for References

The following style should be used since citations in the text are numbered sequentially and the “References” list is ordered numerically. This is the only acceptable format.

(Note the style: Full surname followed by abbreviated first and middle name, separated by semicolons, The abbreviated Journal Name in italics, the year of publication in bold followed by the volume and starting page of the article.)

The following is the list of various type of references that you might cite. The format for a particular reference type is shown as an example below.

- **Citation of Journal article/communication/letter/note/review**

(1) Shah, S.; Rangarajan, S.; Friedman, S. H. *Angew. Chem., Int. Ed.* **2005**, 44, 1328–1332.

- **Citation of Books**

(52) Austin, G. T. *Shreve’s Chemical Process Industries*; McGraw–Hill: New York, 1984; Vol. 5.

- **Citation of Patents**

(25) Cramm, N.T., A Device to Simplify the Conversion of Bibliographic Information into Citation Format. U.S. Patent 7,005,423, Sep 13, 2005.

- **Citation of Conference Publication**

(13) Zhao, H.; Yuman, C. Energy Analysis of a Steam Power Plant with Direct Air-Cooling System in China. In *Asia-Pacific Power and Energy Engineering Conference 2009 (APPEEC 2009)*; IEEE Press: Piscataway, NJ, 2009; pp 1–4.

- **Citation of Web-accessed Information**

For citing websites please see page 15.

## **List of Publication(s) from M. Tech. research work**

### **•Papers Published in Peer Reviewed Journals**

- 1.
- 2.
- 3.

### **•Papers Published in Conferences**

- 1.
- 2.
- 3.

### **• Book chapter**

- 1.
- 2.
- 3.

### **•Patents**

- 1.
- 2.
- 3.

Format should be as mentioned in Reference section.

## **Preparation and Submission of Thesis**

### **5.1. Supervisory Committee and Final Approval Forms**

Some forms are included in this document. Other forms are available in the intranet of IIT Patna website. Updated forms are to be used only. Some important forms are available in this manual also. You may also contact CET OFFICE in this regard.

### **5.2. Curriculum vitae**

This is optional. The student might wish to add his/her curriculum vitae limited strictly to one page and without any photographs. This can be incorporated at the end of the thesis.

### **5.3. CHECKLIST before submitting the final copies of your thesis (NOT TO BE INCLUDED IN THESIS)**

- ☐ Is the author's full name on the title page and the abstract?
- ☐ Are the correct names and titles of the thesis supervisor(s) and program head(s) on the title page?
- ☐ Does the title on the title and abstract pages agree with the title given to the Program Coordinator?
- ☐ Is the publication date correct on the title page?
- ☐ Does the title page carry the appropriate copyright notice (or separate copyright page whatever applicable) and, in cases where the student owns copyright, the appropriate copyright permission statement?
- ☐ Is the supervisor's name mentioned on the abstract page?
- ☐ Is the page-numbering sequence complete and correct?
- ☐ If you are printing double-sided (which is highly recommended), are page numbers placed either in the center or on the outside edge of every page?
- ☐ Have you obtained permission to use previously published material?
- ☐ Are you printing the thesis, including the title page, on the correct paper?

- ☐ Are you printing the correct number of copies?
- ☐ Are all necessary signatures on the title page of each copy?
- ☐ Has each copy been correctly collated? Are any pages missing or are out of order?
- ☐ Are you submitting the correct number of copies?
- ☐ Ensure that the thesis is completely free of plagiarism.
- ☐ IPR declaration in case part of the thesis work carried out at the industry.

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## **Suggestive Guidelines (NOT TO BE INCLUDED IN THESIS)**

M.Tech. students are expected to adhere to the following suggestive guidelines:

1. Introduction (Chapter 1)

The introduction must contain a general overview about the topic of interest citing all important breakthroughs in the field, describing them adequately keeping in view the scopes and limitations. This will be a preamble to the scopes and objectives of the study.

2. General Experimental/Theoretical Techniques and Instrumentation

The general experimental (instruments, parameters, etc.) and theoretical (published methods, programs etc.) methods must be mentioned and justified. This should be followed by adequate description of the necessary instrumentation involved to carry out the present investigation.

3. This chapter shall describe the actual work in the present study. The chapter must outline the current related literature about the subject of interest along with a specific objective, description of results, discussions derived from them, conclusions derived, experimental procedure and references. Like this chapter, there may be others needed to meet the general objectives described in the introduction. The extent of work is solely the prerogative of the advisor.

4. An executive conclusion based on the results that justify all the objectives described in the introduction.

5. Glossary