

GUIDELINES FOR PREPARING THE THESIS

Doctor of Philosophy (Ph.D.)



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Uttarakhand State Govt.)

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GUIDELINES FOR PREPARING THE THESIS

GENERAL

As enshrined in the Acts, Regulations and Ordinances of the Veer Madho Singh Bhandari, Uttarakhand Technical University, Dehradun, the objectives of the research, in general, encompass the discovery of new facts or techniques or correlation of facts already known, through analytical or experimental approach or both, while demonstrating the potential to make a definite contribution to the advancement of knowledge useful to the society and the scholar's ability to undertake sustained research in future. Accordingly, a thesis being a documented manifestation of the above objectives, shall report, in an organized and scholarly fashion, an account of the original research work of the scholar and present the findings in an appropriate manner with actual accomplishments of the work plainly stated and honestly appraised.

The purpose of this manual is to provide broad guidelines to the Ph.D. candidates for preparation of the thesis. It lists the general and specific requirements governing the thesis preparation, including the guidelines for structuring the contents. The candidates are advised to have thoroughly gone through the up-to-date Ph.D. Ordinances, and other relevant announcements brought out from time to time by the University. Further, for style, structure and presentation of a very special type of work specific to a particular field, the scholar may refer to additional style manuals or reference guides and to the published literature in their respective fields of study.

1. ARRANGEMENT OF THE CONTENTS OF THESIS

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

- 1.1. Cover Page and Title Page
- 1.2. Bonafide Certificate
- 1.3. Abstract
- 1.4. Acknowledgement

- 1.5. Contents
- 1.6. List of Tables
- 1.7. List of Figures
- 1.8. List of Symbols, Abbreviations and Nomenclature
- 1.9. Chapters 1, 2 , ...
- 1.10. References
- 1.11. Appendices (If any)
- 1.12. List of Publications (out of the candidate's present work)
- 1.13. Curriculum Vitae (of the Candidate)

The tables and figures shall be introduced at the appropriate places in the manuscript.

1.1 Cover Page

A specimen of the cover page is given in the Annexure I (Take as applicable). It carries

(a) the **TITLE OF THE THESIS**(Times New Roman, font size 20, bold, single line spacing, all characters uppercase except the symbols and numerals if used in the title of the thesis; centered within the specified margin of the page).

TITLE OF THE THESIS

(b) The phrase (Times New Roman, font size 14, bold, each line in the Title/Sentence mode, single line spacing, centered within the specified margin of the page).

A Thesis Submitted
in Partial Fulfillment of the Requirements
for the Degree of

(c) The name of the degree (Times New Roman, font size 20, bold, in uppercase, centered within the specified margin of the page).

DOCTOR OF PHILOSOPHY

In

Field of Specialization

where

In (Times New Roman, font size 14, bold, both the characters lower case, centered within the specified margin of the page).

Field of Specialization (Times New Roman, font size 16, bold, in Title Mode, centered within the specified margin of the page).

(d) by (Times New Roman, font size 14, bold, both the characters lower case, centered within the specified margin of the page).

by

(e) Name of Student (Times New Roman, font size 16, bold, full name as enrolled and given in official documents, all characters in Title mode case, centered within the specified margin of the page).

Name of Student

(f) (Enrollment Number) (Times New Roman, font size 12, bold, all numerals within a pair of small parenthesis, underneath the name of candidate and centered within the specified margin of the page).

(Enrollment no. xxxxxxxxx)

(g) Phrase of supervision (Times New Roman, font size 12, bold, line in the Title mode, centered within the specified margin of the page).

Under the Supervision of

(h) Name of Supervisor(s) (Times New Roman, font size 14, full name in title mode prefixed by Prof. or Dr. centered within the specified margin of the page, separated

Symmetrically, one line only in case of two supervisors, use next line in case of three supervisors (have third name in the center of second line); brief one-line mention of the names of the institution of the supervisors).

Prof. Duryodhan Singh Chatterjee

Excellent Institute of Technology Hazaratganj Lucknow

(i) University (UTU) logo (size = 25-30 mm dia) – It can be downloaded from the University website.

(j) Phrase for the name of faculty (Times New Roman, 12/14 pts., bold, full name of the University faculty in title mode, centered within the specified margin of the page).

to the

Faculty of (Name of the Department)

For example,

Faculty of Applied Sciences

(k) Name of the University (Times New Roman, font size 16/14, bold, full name, all characters upper case/Title mode, centered within the specified margin of the page).

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(l) Month, Year ((Times New Roman, font size 14, bold, full name of the month in title mode, comma, 4-digit year in Arabic, all centered with in the specified margin of the page).

October, 2022

1.2. Bonafide Certificate of Supervision

The Bonafide Certificate of Supervision of the thesis by the supervisor(s) shall be in double line spacing using Times New Roman font size 12, as per the format shown in Annexure II . The heading CERTIFICATE Times New Roman font size 14bold in the center should start about 60mm -70mm from the top of the page.

The certificate shall carry the supervisor's signature in original and shall be followed by the supervisor's name, official seal, academic designation (not any other responsibilities of administrative nature), department and full address of the institution where the supervisor has guided the research scholar.

In case of two supervisors, the details about the signature, names, etc. mentioned above shall be centered symmetrically within the specified margin of the page. In case of three supervisors, the details of the third supervisor will appear in the center underneath the first two.

The place and date of signature (left justified) common for all the supervisors will appear below the signature(s) of the supervisor(s).

1.3 Abstract

Abstract should be an essay type of narration not exceeding four pages outlining the research problem, the methodology used, a summary of the findings, possible applications of research, and suggestions/directions for future research. The abstract should not contain cross citations. It should be typed single in line spacing, in Times New Roman with font size 12 within specified margin of the page. It should begin with the heading as the title of the thesis in title mode centered (bold), name of candidate (next line) centered, and then 'ABSTRACT' with font size 14, bold and centered. The text of abstract should begin thereafter.

1.4. Acknowledgement (optional)

Acknowledgement shall be brief and should not exceed one page typed in single spacing Times New Roman with font size 12 within the specified margin of the page. It should begin with title **ACKNOWLEDGEMENT** Times New Roman with font size 14 bold as heading placed in centre. Signature of the candidate shall be made at the bottom right end above his/her name typed in title case.

1.5. Contents

The contents should list all the contents following this section. The preceding section, like the Certificate, Abstract and Acknowledgement will also find a place amongst the items listed in the Contents, but the page numbers would appear in lower case.

The title **CONTENTS** in Times New Roman with size 14 bold as heading be placed in center. One and a half spacing should be adopted for typing the contents in a manner shown in specimen copy of the **CONTENTS** in Annexure III.

1.6. List of Tables

The list of tables should have exactly the same numbers and captions as they appear above the tables in the text. See section 3.3 for the style of titling, numbering and placing of tables. Single spacing in Times New Roman with font size 12 should be used.

1.7. List of Figures

The list of figures should have exactly the same numbers and captions as they appear below the figures in the text. See sections 3.3 for the style of titling, numbering and placing of figures. Single spacing in Times New Roman with font size 12 should be used.

1.8. List of Symbols, Abbreviations and Nomenclature

Single spacing in Times New Roman with font size 12 should be used. As far as possible, standard and popularly used symbols, abbreviations etc. should be adopted.

1.9. Chapters

Chapters of a Thesis may be broadly divided as introduction, literature survey and identification of problem, statement formulation and presentation of the problem, method adopted including data collection, data analysis, solution approach, findings, results, discussions, conclusions, and directions for future research.

- A suitable scheme of chapterisation may be got approved by RDC and Supervisors. Chapter may be further divided into several sections and sub-sections, sub-sub-sections, as per need.

- Tables and figures in a chapter should be typed in title mode in single space in Times New Roman with font size 12. The title of table should be placed directly above the table whereas the title of figure should be placed directly underneath the figure in the very same page where these are referred to the contents.
- Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page which refers to the contents they annotate.
- Each chapter should be given an appropriate title.

1.10. Listing of References in the REFERENCE section and Citation of References in the Thesis

Any work of other researchers used either directly or indirectly in the research must be cited at appropriate places in the thesis. It could be a journal paper, a paper in conference proceedings, a monograph, a personal communication, or a book; in physical or electronic form.

There are several standards for referencing. A candidate may choose one of his/her choice with the consent of the thesis supervisor(s) and should be consistent throughout the manuscript. A simple and commonly used approach is suggested here.

A reference (other than a book or monograph) should be mentioned at the appropriate places in the text of the thesis by the last name of the first author, followed by the year of publication placed inside a pair of parentheses. For example....

- (i) An improved algorithm has been adopted in literature by Jha and Shanker (2009)
- (ii) The issue of FMS scheduling along with balancing has been discussed by Kumar and Shanker (2000a) while the interaction amongst the objectives has been extensively investigated by Kumar and Shanker (2000b) and Stecke et al (1984).

In case of a book or a monograph, however, the name/s of author should be followed by year within the pair of parentheses. For example,

Chopra and Meindl (2003) have dealt at length the analysis and design of supply chain.

For the references having two authors, the last names of the two authors in the order of appearance can be used while for more than two authors, generally the last name of the first author followed by et al and then the year with in parentheses is used. The listing of references should be typed in alphabetical order of the first author's surname.

In single spacing starting 4 spaces below the heading **REFERENCES** in Times New Roman with font size 14 bold. The name/s of the authors/authors should be immediately followed by the year and other details. The references should be serially numbered, separated by single space. The papers (in journal or proceedings) should be in sentence mode followed by the name of journal (in italics), vol. issue, and page (from-to) while the book titles should be in title mode in italics followed by the place and publishers. E- Resources should have their proper URL. A typical illustrative list given relates to the citation examples quoted above. For typing the references, Times New Roman with font size 11 is recommended below:

Jha, J.K. and Shanker, K., 2009. A single-vendor single-buyer production-inventory model with controllable lead time and service level constraint for decaying items. *International Journal of Production Research*, Vol. 47, Issue 24, pp. 6875-6898.

Chopra, S. and Meindl, P., 2003. *Supply Chain Management: Strategy, Planning, and Operation*. New Jersey, Prentice Hall.

Kumar Neeraj and Shanke rKripa, 2000a, A theory of balancing mechanism for comparing the effectiveness of imbalance measures in FMS loading, Proceedings of the Special International Conference on Production Research (ICPR) 2000,Bangkok, August 2-4, 2000, pp 133-139.

Kumar Neeraj and Shanker Kripa, 2000b. Interaction among FMS loading objectives: a parabolic relationship between workload balance and machine utilization, Proceedings of the Special International Conference on Production Research (ICPR) 2000, Bangkok, August 2-4, 2000, pp 234-239.

Snyder, L.V., 2004. *Lehigh University*. [Online] (1.3) Available at: <http://www.lehigh.edu/~lvs2/download/vrpsolver.html> [accessed 17 December 2008].

1.11. Appendices

Appendices (if any) in a thesis are provided to give supplementary information, which if included in the main text may serve as a distraction and could tend to dilute the central theme under discussion.

- Each appendix must find its reference in the main body of the thesis.
- Appendices shall carry the title of the contents reported, and the same title shall be made in the contents page also.
- Appendices should be numbered using Roman numerals in upper case, e.g. Appendix I, Appendix II, etc.
- Figures, tables, equations and references appearing in appendices should be numbered locally to an appendix e.g. In Appendix I as I-A, I-B, I-C.....and so on, In Appendix II as II-A, II-B, II-C..... etc., and these should be referred to appropriate places as in the case of chapters.

1.12. List of Publications of the Candidate

The list of publications made by the candidate during the period of research and pertaining to the thesis submitted for the degree should only be listed in chronological order in the order of international refereed journals, national refereed journals, proceedings of the conferences, in the same style as followed in providing the list of references (section 1.10). These publications, wherever relevant should be referred to in the main body of the thesis. Only publications made during the research period are to be listed here.

1.13. Curriculum Vitae

A CV mentioning the salient achievements and potentialities of the candidate shall be made at the end of the thesis starting 4 spaces below the heading Curriculum Vitae (in Times New Roman with font size 14 bold), and shall be made in three paragraphs

in single spacing using Times New Roman using 12 size, and shall be restricted to a single page.

2. MANUSCRIPT PREPARATION

- The page dimensions of the final copies of the thesis should be 290mm x205mm. Standard A4 size (297mm x 210mm) paper may be used for preparing the copies. It should have the following page margins:

| | | |
|-------------|---|-----------------|
| Top edge | : | 30 to 35 mm |
| Bottom edge | : | 25 to 30mm Left |
| side | : | 35 to 40mm |
| Right side | : | 20 to 25 mm |

- The thesis should be prepared on good quality white papers, preferably not lower than 80 gsm.

- Tables and figures should also be prepared on good quality papers, preferably not lower than 80 gsm. Tables and figures should conform to the margin specifications. Large size figures should be photographically or otherwise reduced to the appropriate size before insertion.

2.1 Important Information

- This section includes additional information required for final typing of the thesis.
- The impression on the typed/ duplicated/ printed copies should be black in colour.
- Corrections, interlineations and crossing out of letters or words are not permitted in any of the copy of thesis intended for submission. Erasures, if made, should be neatly carried out in all copies.
- A sub-heading at the bottom of a page must have at least two full lines below it, else it should be carried over to the next page.
- The last word of any page should not be splitted using a hyphen.

- Single spacing should be used for typing the general text. The general text shall be typed in Times New Roman and Font Size 12.
 - Single spacing should also be used for typing:
 - Long Tables
 - Long quotations
 - Foot notes
 - Multilane captions
 - References
- All quotations exceeding one line should be typed in an indented space - the indentation being 15mm from either margin.

2.2 Chapters, Sections, Sub -sections, and Paragraphs

The format for typing Chapter headings, Section headings and sub-section headings are explained through the following illustrative examples.

Chapter headings CHAPTER 1 INTRODUCTION Section 1.1

Background

Section 1.2 Scenario in India

Sub-section heading 1.2 .1 Need for the research work

The word CHAPTER (no.) without punctuation should be centered 50mm down from the top of the page. Two spaces below, the title of the chapter should be typed centrally in upper case (capital letters) TITLE OF THE CHAPTER. The text should commence 4 spaces below this title, the first letter of the text starting 20mm, inside from the left hand margin.

The section or sub-section headings preceded by their numbers should be left-justified. The typed material directly below section or sub-section headings should commence 2 spaces below it and should be offset 20 mm from the left hand margin. The text can be divided over paragraphs with in a section or sub-section. Each paragraph should commence 2 spaces below the last line of the preceding paragraph, the first letter in the paragraph being indented from the left hand margin by 20mm.

3. NUMBERING INSTRUCTIONS

3.1 Page Numbering

The preliminary pages of the thesis (such as Title page, Acknowledgement , Contents etc.) should be numbered in lowercase Roman numerals e.g. (i), (ii), (iii), The Title page, however, will be treated numbered as (i) but this will not be typed. The page immediately following the title page shall be numbered (ii) and it should appear at the bottom center of the page, and so on. Pages of the main text, starting with Chapter 1 should be consecutively numbered using Arabic numerals e.g. 1, 2,... All page numbers (whether Roman or Arabic) should be typed without punctuation in the center of the page 20mm above from the bottom.

3.2 Numbering of Chapters, Sections and Sub -sections

The numbering of Chapters, sections and sub-sections should be done using Arabic numerals only and further decimal notation should be used for numbering the sections and sub-sections within a chapter. For examples sub-section4 under section 3 of chapter 2 should be numbered as 2.3.4. The heading for a section or a subsection should immediately follow in the same line after the number with a single space in between. Appendices and their sections and sub-sections should be numbered in an identical manner using upper case Roman, e.g. I, II, starting with Appendix I .

3.3 Numbering of Tables and Figures

Table is meant the representation of tabulated numerical as well as non- numerical data in the body of thesis and also in the appendices. All other non-verbal material used in the body of thesis and appendices, such as charts, graphs, maps, photographs and diagrams maybe designated as figures. A proper representation of a table or a figure and its placement immensely adds to the ability to comprehend the work effectively.

- A table or figure including its caption should be accommodated within the prescribed margin limits and should appear on the page where its reference is made or on the page following the page, in case it is not possible to place it on the same page, due to its large size.
- Tables and figures on half or less length should necessarily appear on the same page along with the text caption. These should be separated from the text of the thesis both above and below by double spacing.
- All tables and figures should be prepared on the same paper or material used for the preparation of the rest of the thesis.
- Captions of table/figures may use characters, numerals or symbols in the title mode.
- Two or more small tables or figures may be grouped if necessary on a single page. However, these should be properly readable.

- Wherever possible, the color photographs(s) may be reproduced on a full sheet of photographic paper. More than one photograph can be included on a page but it should display the required information.
- Samples of fabric leather, etc., if absolutely necessary may be attached evenly in a page and fixed/ pasted suitably and should be treated as figures.

Tables and figures appearing anywhere in the thesis should bear appropriate numbers. The rule for assigning such numbers is illustrated through an example. If a figure in Chapter 3 happens to be the fourth then it is numbered as Fig. 3.4. Identical rules apply for tables except that the word figure is replaced by the word Table. If figures (or tables) appear in Appendices, for example the third figure in Appendix II will be designated as Fig. II-C. If a table is to be continued into the next page, then a line should be drawn underneath an unfinished table and the Phrase continued. Placed on the right side and underlined should be typed just below the line.

The top line of the table continued on the next page should, for example read Table 2.1 (continued) placed centrally and underlined.

While referring to a figure or table in the body of the thesis, it should be referred to as Fig. 2.1, Fig 3.1, Table 2.1, Table 3.1, and so on.

3.4 Numbering of Equations

Equations appearing in each Chapter should be numbered serially, the numbering commencing a fresh for each Chapter. For example, the eighth equation in Chapter 2 should be numbered as (2.8) thus:

$$F_c = k [V_c/V_c + V_w + V_a]^2 \quad (2.8)$$

While referring to this equation in the body of the thesis, it should be referred to as Eq.(2.8).

4. THESIS SUBMISSION AND BINDING SPECIFICATIONS

4.1 Preparation of Research Summary

After the completion of the research work and preparation of the draft thesis, a research summary is to be prepared in consultation with the supervisor(s). It should begin with the title of the thesis (in Times New Roman with size 14 bold, centered), a single space gap, followed by the name and enrollment of the candidate (in Times New Roman with size 12 bold, centered) and then a single space gap followed by the title RESEARCHSUMMARY (in Times New Roman with size 12 bold, capital letters and centered). After a gap of a

space, the text should begin on the same page (there is no need for a title page).

Like thesis, the RESEARCHSUMMARY may be broadly divided into introduction, literature survey and identification of problem, formulation and presentation of the problem, method used data collection data analysis, solution approach, findings, results, discussion, conclusions, and directions for future research. It should be typed in single line spacing, Times New Roman with font size 12 within the specified margin of the page. The total number of typed pages should not exceed 10. The use of tables, figures, equations should be absolutely minimum, unless these are extremely essential. Only the essential references should appear in the text. Sections and subsections (not exactly the same as used in the main thesis) may be used to enhance the readability. Only minimal essential part of Appendices, and Reference list should be included as part of the RESEARCH SUMMARY.

4.2 Submission of Thesis for Evaluation

(a) The thesis and research summary should be prepared as per guidelines provided in this manual. Refer to Ph.D. ordinances for further details.

(b) For evaluation purposes, a candidate for Ph.D degree is required to submit

(i) The candidate should fill the checklist and sign the Certificate of Thesis Submission for Evaluation (Annexure IV). The Certificate should also be signed by the Supervisors, and submitted by the candidate in duplicate.

(ii) Four copies of RESEARCHSUMMARY (along with a digital copy).

(iii) Four hard copies of the thesis printed on both sides and spiral bound using flexible cover of thick white art paper. The cover page should be printed as per specifications for the title page(Annexure I). One copy of the Thesis after stamping by the concerned official of UTU with due entries will be returned to the candidate.

(iv) A CD with exactly identical contents in pdf format. The candidate should ensure that the CD can be opened on any system.

(c) Contact University for further details, if required.

4.3 Submission after Corrections/ Evaluation

The candidate should finalize the thesis incorporating all the suggestions made during the evaluation process by the internal and external examiners and re-submit the thesis. These observations received from internal and external examiners will be communicated to the candidate and supervisors by the University.

Following should then be submitted:

(a) Certificate of Final Thesis Submission (Annexure V) is to be signed by the candidate

and the supervisor(s) certifying that all the corrections suggested by the examiners have been incorporated, the thesis has been prepared as per guidelines, due credit to other researchers cited in the thesis has been appropriately accorded and no part of the thesis is copied from any other source.

(b) The final thesis should be printed on both sides on good quality white paper not less than 80gsm and hard bound as per specifications given in Annexure VI. The cover page should be printed as per specifications for the title page (Annexure I) except that it will include month and year of final submission.

(c) Colour Code : The colour code for the thesis will be as follows:

(i) Ph. D. - cloth bound dark blue background with impressions embossed in permanent golden colour. The side back of the thesis should also carry the title, name of candidate and month and year of final submission.

(d) For electronic repository of the University, a CD with exactly identical contents as the final thesis in pdf format should also be submitted. The candidate should ensure that the CD can be opened on any system. The CD should carry the name, enrollment number and programme of the candidate.

(e) Number of copies (incorporating all corrections including during viva-voce examination)

Ph.D. Two copies printed on both sides and hard bound as per University specifications, plus a CD with thesis contents in pdf format.

Note: The candidate must submit the required Certificates at the time of both the submissions (a) for evaluation and (b) final after viva voce examination for provisional degree certificate.

5. PAGES IN THE THESIS

There is no rigid restriction on the pages in the thesis. However, for Ph.D. it should not generally exceed 300 pages of the typed matter beginning from the first page of Chapter to the last page of the last page Appendix.

ADDITIONAL READINGS

For knowing more about the styles and presentation, the following few references may be of interest. Candidates may read these for their knowledge enhancement, however guidelines of UTU will be used for thesis submission.

(a) *Michaelson, H.B. How to write & Publish Engineering Papers and Reports. Oryx Press, Phoenix.*

- (b) *Turner, R.P. Technical Report Writing. Rinehart Press, San Francisco.*
- (c) *Turk, C. and Krikman, J. Effective writing: Improving Scientific, Technical and Business Communication. E & FN Spon, London.*
- (d) *Campbell, W.G., Ballou, S.V. and Slade, C. Form and Style: Theses, Reports, Term Papers. Houghton Mifflin Co., Boston.*
- (e) *MLA Style Manual and Guide to Scholarly Publishing. Modern Language Association, New York.*
- (f) *Sternberg, D. How to Complete and Survive a Doctoral Dissertation. St. Martin's Griffin, New York.*
- (g) *Day, R.A. and Gastel, B. How to Write and Publish a Scientific Paper. Greenwood Press, Westport.*
- (h) *Booth, W.C., Colomb, G.G. and Williams, J.M. The Craft of Research. The University of Chicago Press, Chicago.*