

# Guidelines and Policy

## For MET Senior Thesis

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Spring, 2013

Dateline



University of Hawai‘i at Manoa  
Department of Meteorology  
Undergraduate Division

**INTRODUCTION**

Congratulations on your progress! The final copy becomes a permanent and official record available for public use. Because your senior thesis is an official addition to the body of scholarship and research undertaken at UH, we provide this document as a guide for its preparation and submission.

Your senior thesis advisor is responsible for reviewing both the style and the content of your manuscript. The guidelines explicated here focus primarily on physical format. If you follow these guidelines, the format of your thesis will meet the minimal requirements. Be aware, however, that your advisor can either waive these or set higher standards. Because it is your responsibility to ensure that your thesis is a professional document, you are advised to become thoroughly familiar with these instructions before you begin writing. Consult with your advisor regarding current standards and models unique to your topic of study.



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## **1. PROCEDURES**

### **1.1 Responsibility**

The student is solely responsible for the preparation of the senior thesis according to the format and timetable prescribed by the faculty advisors, and within the timetable specified by the Undergraduate Division. A Pre-approval form (Sample A) needs to be signed and approved by both the advisor(s) and the undergraduate chair. It is the responsibility of the student's advisor(s) to judge the acceptability of the thesis from all standpoints, including writing quality, neatness, mechanical considerations, and technical and professional competency. Advisor(s) will attest to the acceptability when they sign the signature page. Therefore, it is important that a complete draft of the thesis be reviewed by the advisors before the student's seminar presentation.

The student and his/her thesis advisors are jointly responsible for seeing that the manuscript follows a correct form of scholarly style and usage. In fulfillment of this responsibility, the advisors must have seen and approved the changes the student has made in response to those criticisms before final typing of the thesis. After successful presentation at the seminar, the advisors indicate approval of the final copy by affixing their signature(s) on the signature page. After completion of senior thesis presentation, both the advisor(s) and the undergraduate chair must sign the form of Completion (Sample B). They will be reviewing for breadth and completeness of work, format and style.

### **1.2 Language**

The senior thesis must be written in English. All MET major undergraduate requirements must be met. The thesis must be read and approved by advisors.

### **1.3 Registration for MET 495**

MET 495 is a directed research course in which the student carries out a scientific project of small to moderate scope with one or more chosen advisors.

### **1.4 Application for Degree and Payment of Fees**

An application for graduation must be obtained from SOEST Student Academic Advisor, Leona Anthony at HIG 135 and then submitted with the degree fee to the Cashier's Office, Queen Lili'uokalani Center for Student Services, Room 105. This must be done by the deadlines specified in the "Calendar." Please refer to the University of Hawaii at Manoa Catalogue for more information on fees.

### **1.5 Senior Thesis**

An oral presentation and a written thesis in the following format must be turned in before graduation. It must be read, signed and approved by advisors.

## **2. ORGANIZATION OF CONTENTS**

The following preliminary pages precede the body of the thesis, should appear in this order, and with the exception of the title page are numbered in lowercase Roman numerals.

- Title page (no page number)
- Signature page
- Copyright page (optional)

- Dedication page (optional)
- Acknowledgments (optional)
- Abstract
- Table of contents
- List of tables
- List of figures/illustrations/graphs/charts/maps/plates
- List of abbreviations and symbols (optional)
- Preface (optional)

The text and other pages following the preliminary pages are numbered with Arabic numerals and must be arranged in the following order:

- Text (chapters of the manuscript, including tables and figures)
- Appendices
- Notes
- Glossary (optional)
- Bibliography/references
- Index (optional)

## **2.1 Title Page**

Sample C, provided at the back of this booklet, illustrates acceptable thesis title page format. Please include an ‘okina(‘) before the last “i” when writing out “Hawai‘i.”

Indicate your degree and field (e.g., Bachelor of Science in Meteorology, and give the month and year of graduation (December, May, or August). Do not use date you completed or turned in the thesis.

Advisor(s) name must appear on the title page.

## **2.2 Signature Page**

Obtain original signatures of advisors. Type only as many lines as there are advisors signing. Signatures must be in permanent BLACK INK. Refer to Sample D for signature format. To safeguard against advisors signing into the right margin, it is suggested that you increase the right margin on this page to two inches (as has been done on Sample D). In addition, the page number should be positioned consistently with the page numbers in the rest of the manuscript (either in the top right corner or centered one inch from the bottom of the page).

You must submit the original signature page with the thesis.

## **2.3 Acknowledgements**

Use your discretion in making acknowledgements. It is customary to acknowledge special assistance from extramural agencies. There is no obligation that assistance received from advisors be acknowledged. Acknowledgments should be couched in terms consistent with the scholarly nature of the work. Your name and the date should not appear on this page.

## **2.4 Abstract**

An abstract is required for a thesis. The abstract included with the thesis must be double-spaced and the title should simply be ABSTRACT.

## **2.5 Table of Contents**

## TABLE OF CONTENTS

Acknowledgments .....	iii
Abstract .....	iv
List of Tables .....	vi
List of Figures .....	vii
List of Abbreviations .....	viii
Preface .....	ix
Chapter 1: Introduction .....	1
Chapter 2: Method .....	11
Chapter 3: Results .....	50
Chapter 4: Conclusion .....	100
Appendix	
A:.....	124
Appendix B:.....	142
References .....	163

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The table of contents is to include the following pages: acknowledgements, abstract, list of tables, list of figures, list of abbreviations and/or symbols, appendices and bibliography as well as the major sections of the text. Please note the following:

- You must have lot leaders between the end of a heading and its page number.
- Wording of headings on the table of contents must reflect wording of headings within the text precisely. Each new sub-level heading must be indented to distinguish it from the previous sub-level. (See Section 3.2.)
- The title page, signature page, dedication page, and the table of contents are not listed in the table of contents, however with the exception of the title page, these pages must be numbered.

### 2.6 List of Tables



## LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Data Used .....	9
2. Model Parameters .....	12
3. Experiments .....	21
4. Regimes Identified.....	36

The term “table” applies to numerical and statistical data set in vertical or horizontal alignment. If there are tables in your text or appendix, a list of tables must be included. The list of tables is on a page by itself and arranged in the same general format as the table of contents. Type the table numbers in Arabic numerals, and the titles in uppercase and lowercase letters, with dot leaders extending from the last letter of the title to the page number. Please note:

- Titles may be shorter than they appear in the text as long as they are not misleading. Titles may not be longer than the titles in the text.
- Numbering of tables. You have two options: (1) you may begin by numbering the first table with “1” and continue to number your tables consecutively throughout the entire manuscript; or (2) using a decimal numbering system you may number your tables consecutively within each chapter. Thus, if chapter four has three tables and chapter five has three tables, the numbering would be as follows: 4.1, 4.2, 4.3, 5.1, 5.2, 5.3. The same numbering system applies to figures.
- Single space with titles which are longer than one line, but double space between each entry.

### **2.7 List of Charts, Graphs, Figures, Illustrations, Plates, Maps**

This list is also placed on a page by itself and arranged in the same general format as the list of tables. Designate figure numbers with Arabic numerals, and plate numbers, if any, with capital Roman numerals. If the thesis contains both figures and plates, arrange them on separate lists.

## LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Map of O‘ahu .....	18
2. Vertical Profile, Region A .....	50
3. Vertical Profile, Region B .....	51
4. Vertical Profile, Region C .....	52
5. Distribution of Inversion Height.....	74

### **2.8 List of Abbreviations and/or Symbols**

If abbreviations and/or symbols are needed in the text, a list should be provided to explain their definitions or meanings. The list is to be placed on a separate page and included after the list of figures.

## **2.9 Preface**

A preface, while optional, enables you to explain your purpose and perhaps justify your choice of a topic. If utilized, it is part of the preliminary pages (numbered with lowercase Roman numerals) and, therefore, precedes the main text.

## **2.10 Text**

The organization of the text varies with the discipline and the subject matter. If the thesis is divided into chapters, each chapter must be titled and must begin on a new page. Chapter headings must be centered, and a consistent font size and style should be used throughout the paper. If you are dividing your thesis into “parts” as well as chapters, the designations of “Part I,” “Part II,” etc., must appear on a separate cover page. Each chapter begins on a new page. Chapters within parts are numbered consecutively through the manuscript (not beginning over with 1 in each Part).

## **2.11 Appendices**

Materials not vital to the text, but which supplement the text, are placed in an appendix or appendices. Appendices may include schedules, lists, questionnaires, tests and forms used to collect data, as well as case studies and series of plates, graphs or charts which would take up too much space or which would be distracting if placed in the text. Do not use cover pages; simply center the title of the appendix at the top of the first page of the appendix (following the format of chapter titles).

Each type of material (e.g., tables, questionnaires) forms a separate appendix, which must be labeled separately (Appendix A, Appendix B, etc.); each appendix must be titled (title should give indication of the content/material that is included in the appendix). If only one appendix is used, it should be designated simply “Appendix”, not “Appendix A.”

The appendices must meet the specifications for other pages in the text with respect to margins, appropriate pagination, quality of reproduction and paper, etc.

## **2.12 Bibliography/References**

Use a bibliographic style that is professionally accepted in your field. The bibliography appears immediately after the last page of the text unless an appendix intervenes, in which case it follows the appendix. The references must be the last element of the thesis unless there is an index.

The bibliography must include every reference mentioned in the body or cited in the footnotes of the text. Under no circumstances should materials that have not been used in the preparation of the thesis be cited. The heading “Literature Cited” may be used when the list includes only those references which have been cited in the text or footnotes. In every case, consult with your advisors as to the form and arrangement of the bibliography.

## **3. TEXT FORMAT**

### **3.1 Style**

With the exception of the guidelines in this booklet, all aspects of style, usage, and format are left to the discretion of the advisors. Students and their advisors are urged to refer to one of the leading style guides or to the style of a leading journal for publication in the discipline, for those aspects left to their discretion.

### **3.2 Headings in the Text**

It is important that headings and subheadings be consistent throughout the document. Not only does this give the document a professional appearance, it provides clarity and guidance to the reader. Please heed the following guidelines:

Major Headings. These include acknowledgements, abstract, table of contents, lists of tables and figures, preface, chapter headings, appendices and bibliography. Begin each major heading on a new page, followed immediately by the text. All of these headings must be done in the same size and style (e.g., all capital letters, all bold letters). The chapter heading appears only on the first page of the chapter.

Subheadings. Each different level must be distinguished by a different style. For example, the first sub-level might be centered and underlined, and the second sub-level might be flush left with no underline. Be sure that these styles are used consistently! Although each different level must be distinguished, the same level must have a consistent style throughout the work. Subheadings should NOT begin on a new page (unless, of course, the previous section ended at the bottom of a page).

Each different sub-level must be listed appropriately in the table of contents. Each new sub-level is indented a little farther right than the previous level in the table of contents. The title of the thesis should appear only on the title page. Please note that in the following examples, the dotted lines represent text.

### **3.3 Margins**

Standardized margins are required on every page to ensure that no part of the thesis is cut off when it is bound and trimmed. The left margin must be 1.5 inches from the edge; all other margins must be at least 1 inch from the edge. The only exception is facing pages, which should have the 1.5 inch margin on the right side. Page numbers must fall **within** the margins.

### **3.4 Use of Languages other than English**

Choose a style and be consistent. The Chicago Manual of Style suggests that isolated words or phrases in a foreign language be set in italics, but underlining can also be used. A quotation entirely in a foreign language should only be enclosed in quotation marks, not italicized or underlined. Also, foreign words commonly used in English (i.e., they can be found in a good English dictionary) should not be distinguished.

When using Hawaiian words, be consistent. If you are going to write them as they are written in Hawaiian, then do so throughout your paper. For example, when writing the “University of Hawai‘i at Mānoa,” an ‘okina (‘) should be included before the last “i” in Hawai‘i and a kahakō ( ¯ ) is necessary above the first “a” in “Mānoa.”

### **3.5 Line Spacing/Widows and Orphans**

Double spacing is required except where style calls for single spacing (e.g., footnotes, indented quotations, tables).

Widows (e.g., the last line of a paragraph as the first line of a page) and orphans (e.g., a heading or first line of a paragraph as the last line on a page) are not acceptable.

### **3.6 Punctuation**

Many common manuscript problems involve punctuation, especially the use of commas. For example, when used with quotation marks, commas and periods are placed within the quotation marks while colons and semicolons are placed outside of the quotation marks. Also remember to use commas after the terms “e.g.” and “i.e.”

### **3.7 Hyphenation**

Consult a dictionary for correct hyphenation. As a general rule, no more than three hyphens at the end of a line per page are acceptable. It is also not acceptable to have more than two consecutive hyphens at the ends of lines. Be sure to check the number of hyphenated words per page if you are using the automatic hyphenation function on your computer.

### **3.8 Pagination**

Every page in your manuscript must be counted in the numbering. A page number must appear on every page with the exception of the title page and cover pages for “Part I, II,” etc. Placement, size, and style of page numbers must be consistent throughout and should not exceed the margins. Page numbers should appear either in the top right corner (one inch from the right edge of the paper and one inch from the top) or centered one inch from the bottom of the page. This includes the signature page as well as pages with tables, figures, appendices, etc. Page numbers with letter suffixes, such as 10a, 10b, etc. are not acceptable. Do not write the word “page” before the number. No dashes, periods, underlining, or any other marks may appear before, after, or under the page numbers. Zeroes with a slash through them are not acceptable.

#### ***3.8.1 Preliminary Pages***

Preliminary pages (see Section 2. for a detailed list) are numbered in lowercase Roman numerals (ii, iii, iv, etc.), beginning with the signature page, which should be numbered “ii,” and so on to the end of the preliminaries. (Note: The title page counts as page “i” but the number is not placed on the page.) Placement of preliminary page numbers should be consistent with the placement of page numbers throughout the text.

#### ***3.8.2 Body of Thesis***

These pages are numbered in Arabic numerals (1, 2, 3, etc.), beginning with the first page of Chapter 1 and continuing consecutively to the last page of the bibliography.

#### ***3.8.3 Chapters***

Each chapter must begin on a new page. Chapters should be numbered with either Arabic or Roman numerals. Acceptable methods of indicating chapters are as follows:

CHAPTER 1            or            CHAPTER 1. INTRODUCTION  
INTRODUCTION

#### ***3.8.4 Facing Caption Pages***

Facing caption pages and their corresponding illustrations must have their own page numbers. If you place your numbers at the top right corners the number on the facing page should appear at

the top left corner because the page will be turned to face the accompanying illustration. Both figure and facing pages need page numbers. For example, if the facing page is page 4, then the page with the figure will be page 5. The caption should face the same direction as the figure; i.e., if your figure is placed broadside, the caption should be placed broadside as well.

### **3.9 Use of Shading**

Shading may be used as a key to identifying areas of figures. However, shading is not allowed over any type of text if it reduces readability.

### **3.10 Running Headers**

Do not use running head. The title of the thesis appears only on the title page. Likewise, chapter titles appear only on the first page of the chapter.

## **4. ILLUSTRATIONS**

### **4.1 Tables**

The term “table” applies to numerical and statistical data set in vertical or horizontal alignment. Titles should be self-explanatory, concise and consistent in form and font style throughout the thesis.

#### ***4.1.1 Format of Tables***

Type the table number and caption above the data. Titles should begin with the word “Table,” followed by a number, and a period. The title, table number, and caption may be centered or flush left but must be handled consistently throughout the manuscript. The title, table number, and caption may be written in all uppercase or in uppercase and lowercase letters, but must be typed in a consistent manner for subsequent tables.

#### ***4.1.2 Placement***

Tables over half a page in length should be placed on a separate page. Wide tables may be placed broadside on the page with the table number and the caption at the binding side of the page (i.e., with the left-hand margin as the “top” of the page). The first typewritten line should begin no higher than 1.5 inch from the binding side of the page and the last line should end no lower than 1 inch from the bottom.

Tables too wide to be accommodated on one page may be typed on two or more pages, pasted together, and either folded or reduced to page size by a suitable photographic process. Long tables may be continued from page to page, in which case the table number and caption on succeeding pages should appear as follows:

Table 3. (Continued) Number of Tractors Employed in Agriculture in the U.S.S.R.

Place tables within the text if possible. If the thesis contain so many tables that placement within the text would be unwieldy, you may include your tables in an appendix.

#### ***4.1.3 Footnotes***

Footnotes for tables are to be indicated by standard symbols (-, \*, etc.) or lowercase letters (a, b, etc.). Do not use numbers for footnotes to tables. Footnotes are placed at the bottom of the table (not the bottom of the page).

### **4.2 Figures**

The term “figure” refers to illustrations such as graphs, charts, diagrams, photographs, and maps, but not statistical data presented in tables. As with tables, figure titles should be self-explanatory, concise and consistent. Figure captions should be placed at the bottom of the figure, even if the figure is placed broadside on the page.

For placement of figures within the thesis, see section 4.1.2. Please note that if you choose to group your figures together in an appendix or at the end of your text, they should follow your tables (if any), and the references should be the last element of your thesis.

#### ***4.2.1 Format of Figures***

Number figures consecutively in Arabic numerals throughout the thesis, beginning with “1” or consecutively within each chapter.

#### ***4.2.2 Photographs***

Photographs smaller than 8.5 by 11 inches should be mounted (see section 4.5); photographs 8.5 by 11 inches may be bound, but keep in mind that they will be trimmed in the binding process. Every page must have a page number, including, full-page photographs. If it is not possible to print the page number on the front of the page, it may be placed on the back. Full-page photographs require a facing page for numbering and captions. (See section 3.7.4.) Color or black and white Xerox reproductions of photographs are acceptable if high quality photocopying is used.

#### ***4.2.3 Maps***

Each map should have an accurate bar-type scale, some indication of longitude and latitude, and a North arrow for orientation.

### **4.3 Placement of Illustrations and Figures on the Page**

If it is necessary to turn an illustration or table sideways on the page, the top of the illustration or figure must be on the left (binding) edge of the paper.

### **4.4 Oversized Materials**

When folding oversized pages, special care must be given to assure the edge that is folded over does not touch the 1.5 inch left margin, as the edge may be caught in the binding. The entire page should be 8 inches in width rather than 8.5 inches to prevent the fold from being cut when the thesis is trimmed. The page number should be placed in the same position as the regular sized pages.

**Vertical Fold:** Make the first fold at the right side of the page, folding toward the left. The first fold should reduce the oversized sheet to 8 inches. If further folding is necessary, the left side of the folded page should be folded again, this time back towards the right, leaving a 1.5 inch margin from the left and the fold.

**Horizontal Fold:** If folding from the bottom up, be sure to cut a strip 1 inch wide from the left edge of the entire folded portion. This prevents the fold from being caught in the binding. If a second horizontal fold is needed, the edge should be folded down.

### **4.5 Mounting**

Use dry mount tissue (available from art supply stores), photo mount spray adhesive or double-sided contact paper. White glue is not recommended because it causes wrinkles in the paper. Do

not use rubber cement. Mount illustrations on the same paper used for the rest of the thesis. Be sure to leave appropriate margins.

#### **4.6 Back Pocket for Oversized Materials**

Oversized materials (e.g., maps) may be placed in a “pocket” at the back of the paper.

### **5. THE FINAL COPY**

#### **5.1 Typing/Printing of the Manuscript**

The physical appearance of thesis must be immaculate and convey an impression of pride and quality. Your manuscript must be prepared on either a typewriter or computer. All print in the thesis must meet the standards set forth in the paragraphs that follow.

Any standard typeface is acceptable as long as the same typeface is used throughout the manuscript, with the exception of certain tables, figures and appendix material, which may be put in a different type. Italics should be used only to highlight specific words or phrases in the text.

The type size must be 10 point or larger for all material in the text. (This includes any reduced material which may be included.) The print should be letter quality (typewriter or letter-quality printer) with dark black characters that are consistently clear and dense. Print on one side of the page only.

#### **5.2 Paper**

Use only white paper, 8.5 x 11 inches, unpunched, of 20-pound weight. Do not use erasable or onionskin paper.

#### **5.3 Reproduction**

Reproduced copies are acceptable if high quality photocopying is used.

#### **5.4 Corrections**

Correction fluid and correction tape should not be used to cover up errors as they can bleed or flake away from the paper, exposing the uncorrected type. Strikeovers, interlinear insertions, and handwritten corrections are not acceptable.

#### **5.5 Handwritten Annotations**

Be minimal with handwritten annotations. Use permanent ink and, if possible, use a template to ensure neatness and uniformity.

#### **5.6 Number of Copies to Submit**

For the thesis: One unbound copy must be submitted to the department. The thesis advisor should also receive a copy.

### **6. CHECKLIST FOR THE THESIS**

Before submitting your thesis, please check to see that you have done the following:

- Is the information on the title page accurate? Is the title page formatted correctly?
- Does your signature page have original signatures from your advisors in BLACK ink?

- Are the titles and page numbers in the table of contents and lists of tables and illustrations correct?
- Please check the pagination even if you used a word processor to prepare these pages.
- Is your manuscript printed on acceptable grade paper and free of blemishes and holes?
- Is every page legible? Be sure that the quality of print is uniform throughout the thesis.
- Do you have the appropriate margins (1.5 inches on the left side and 1 inch on the top, bottom, and right sides)? Remember that every page (except facing pages, which have the 1.5 inch margin on the right side) in the thesis must have these margins.
- Does every page have a page number? Is the numbering of pages consecutive, with no duplicate or missing numbers? Are the preliminaries numbered with Roman numerals and the text with Arabic numbers? Is the placement, size, and font style of your page numbers consistent throughout the paper?
- Have you checked your major headings and subheadings to ensure that they are consistent throughout the text?
- If you will be leaving the campus before your thesis can be checked, have you made arrangements with someone who will make any necessary corrections?

If you have followed the guidelines in this booklet and completed the checklist above, you should be getting ready to celebrate.





**Department of Meteorology**

**SENIOR THESIS COMPLETION FORM**

NAME:

---

SENIOR THESIS TITLE: \_\_\_\_\_

---

DATE OF PRESENTATION: \_\_\_\_\_

We certify that this thesis, in our opinion, is satisfactory in both scope and quality.

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SIGNATURE OF MENTOR  
DATE

---

---

UNDERGRADUATE CHAIR  
DATE

---

**SAMPLE C: TITLE PAGE FOR THESIS**

*(do not type "Sample" or "Title Page" on the title page your submit!)*

**DYNAMIC AND THERMODYNAMIC PRROPERTIES OF  
THE TRADE WIND INVERSION AROUND OAHU**

**A THESIS SUBMITTED TO  
THE METEOROLOGY DEPARTMENT**

**MAY 2013**

**By**

**Ronald A. Smith**

**Thesis Advisor(s)**

**Gary Barnes  
Michael Bell**

**SAMPLE D: SIGNATURE PAGE FOR THESIS**

*(do not type "Sample" or "Signature page" on the title page your submit!)*

We certify that we have read this thesis and that, in our opinion, it is satisfactory in both scope and quality.

May 30, 2013

THESIS ADVISOR(S)

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Gary Barnes  
Department of Meteorology

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Michael Bell  
Department of Meteorology