

COLLEGE OF ENGINEERING AND AGRO-INDUSTRIAL TECHNOLOGY
UNIVERSITY OF THE PHILIPPINES LOS BAÑOS



FORMATTING GUIDELINES
for
UNDERGRADUATE
THESIS, FIELD PRACTICE and
SPECIAL PROBLEM
MANUSCRIPTS

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ARTICLE 1 GENERAL GUIDELINES

Section 1.1. General Format

The formats stated under this article are hereby defined as the “general formats” and shall be used throughout the whole manuscript. Deviations from these formats are stated in specific sections or paragraphs in subsequent articles.

Section 1.2. Page Size and Dimensions

Thesis and Field Practice manuscripts shall be printed in “letter size” white bond paper. Such paper should have a nominal height of 11 inches (279.4 mm), a nominal width of 8.5 inches (215.9 mm) and a weight not less than 80 grams per square meter (gsm).

Section 1.3. Page Margin

The measurement of margins shall be reckoned from the edge of the page. The following margins shall apply:

Top:	1 inch (2.54 cm)
Bottom:	1 inch (2.54 cm)
Right:	1 inch (2.54 cm)
Left:	1.5 inches (3.81 cm)

Section 1.4. Font Characteristics

The following font characteristics shall be applied in the whole manuscript (including page numbers):

Face:	Times New Roman	
Size :	12	
Style:	Regular	(NOT “ bold ”, “ <i>italicized</i> ” nor “ <u>underlined</u> ”)
Color:	Black	
Scale:	100%	(NOT “<100%” nor “> 100%”)
Spacing:	Normal	(NOT “expanded” nor “condensed”)
Position:	Normal	(NOT “raised” nor “lowered”)

Section 1.5. Paragraph Alignment

(a) Unless otherwise stated, all paragraphs shall be justified, i.e. they shall be aligned to both left and right margins.

(b) Example 1.5:

_____.

_____.

ARTICLE 2 MANUSCRIPT EXTERNAL DESIGN AND STRUCTURE

Section 2.1. Manuscript Binding

Thesis, and Field Practice and Special Problem manuscripts shall be hardbound before submission. Manuscripts bound using other binding methods (soft bound, ring bound, etc) shall not be accepted.

Section 2.2. Cover Color and Covering

(a) Thesis manuscripts shall be covered with maroon hardbound book cover. Field practice manuscripts shall be covered with dark blue hardbound book cover. Special Problem manuscripts shall be covered with chocolate brown hardbound book cover. Crocodile-skin covers shall not be used.

(b) Thesis, and Field Practice and Special Problem manuscripts shall be covered with transparent plastic for added protection.

Section 2.3. Letter Color

All letters to be engraved in the manuscript spine and front cover shall be gold in color, pressed against the maroon, dark blue and chocolate brown cover.

Section 2.4. Design and Layout of the Front Cover

(a) The front cover page shall contain the following information:

Thesis, field practice or special problem title

Full name of the author

Degree

Major (if any)

Date of manuscript submission

(b) The title shall be in uppercase letters (except for scientific names), center-aligned in the page and shall be laid out in an inverse pyramid manner. The first line of the title should be spaced about two (2) inches below the top edge of the front cover.

(c) For titles containing names of places in the PHILIPPINES, the term "PHILIPPINES" should be added after the name of the place. The level of citing the place shall include city/municipality, followed by province, then PHILIPPINES. For titles already containing the word "PHILIPPINES" such as company names or institutions, then the word "PHILIPPINES" may not be again written to avoid redundancy. In this case the place to be written in the title is up to province only. If a well-known company or institution has

no other branches, then only “PHILIPPINES” will be included in the title (city/municipality and province is not necessary at all). The members of the guidance committee shall ensure that this provision is strictly followed.

(d) For titles containing scientific names of organisms the author shall secure a certification from the Museum of Natural History (MNH-UPLB) **at least five (5) working days prior to submission to the guidance committee. The certification shall state** the accepted and correct scientific name of the organism. The certification must be included as part of the Appendix. Furthermore, the author shall follow the recommendation of the MNH on how the scientific name should be written and positioned in the title and in the body of the manuscript. Scientific names should only be written when the object of the study pertains to plants, animals or bio-material/products. The members of the guidance committee shall ensure that this provision is strictly followed.

(e) For titles containing company names or institution, only the acronym of the company or institution should be written on the FRONT COVER. The spelled out acronym followed by the acronym itself enclosed in a parenthesis shall be included in **ABSTRACT/EXECUTIVE SUMMARY.**

(f) The author’s name shall be written in full, first name first, followed by middle name (not middle initial), and then surname. It shall be presented in uppercase letters, center-aligned in the page, and in single line only. The author’s name should be positioned five (5) inches below the top edge of the front cover.

(g) The degree shall be written in full, (e.g. BACHELOR OF SCIENCE IN AGRICULTURAL **AND BIOSYSTEMS** ENGINEERING not B.S. AGRICULTURAL **AND BIOSYSTEMS** ENGINEERING nor BS AGRICULTURAL **AND BIOSYSTEMS** ENG’G), in uppercase letters, center-aligned in the page, and in single line only. The degree should be positioned about 3 ½ inches above the bottom edge of the front cover.

(h) The major shall be written below the degree, in title case (i.e. the first letter of all significant words capitalized), and center-aligned in the page. The major shall be enclosed in parenthesis and shall be introduced by the phrase “Major in” followed by the major.

(i) For consistency, the following terms shall be used to indicate the major of the author:

(i.1) Majors for BS Agricultural Engineering / Agricultural and Biosystems Engineering

- Agricultural Power and Machinery Engineering
- Agricultural and Bio-Process Engineering
- Land and Water Resources Engineering
- Structures and Environment

(i.2) Majors for BS Chemical Engineering

- Sugar Technology
- Pulp and Paper Technology

(i.3) Majors for BS Electrical Engineering

- Power Engineering
- Electronics Engineering
- Computer Engineering

(j) The line for the major shall be omitted for students under the following curricula:

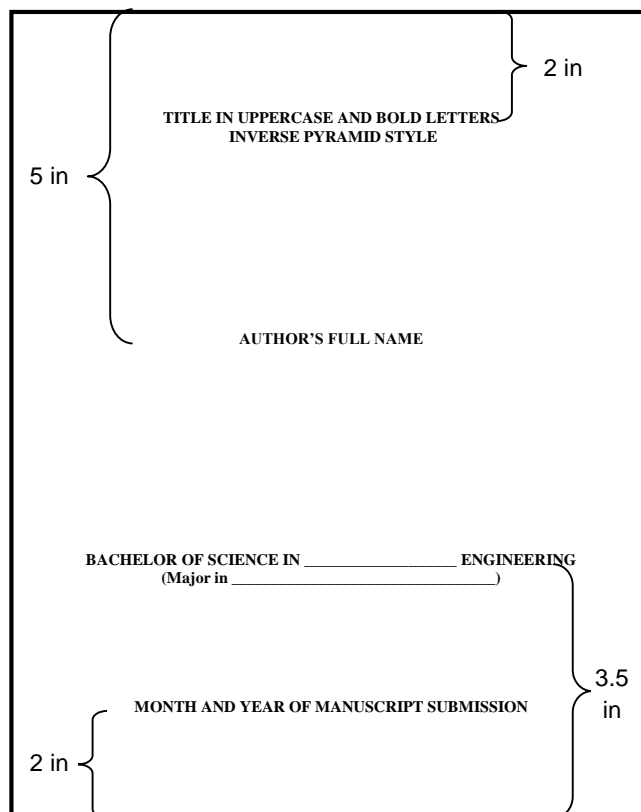
Bachelor of Science in Chemical Engineering (General Curriculum)

Bachelor of Science in Civil Engineering

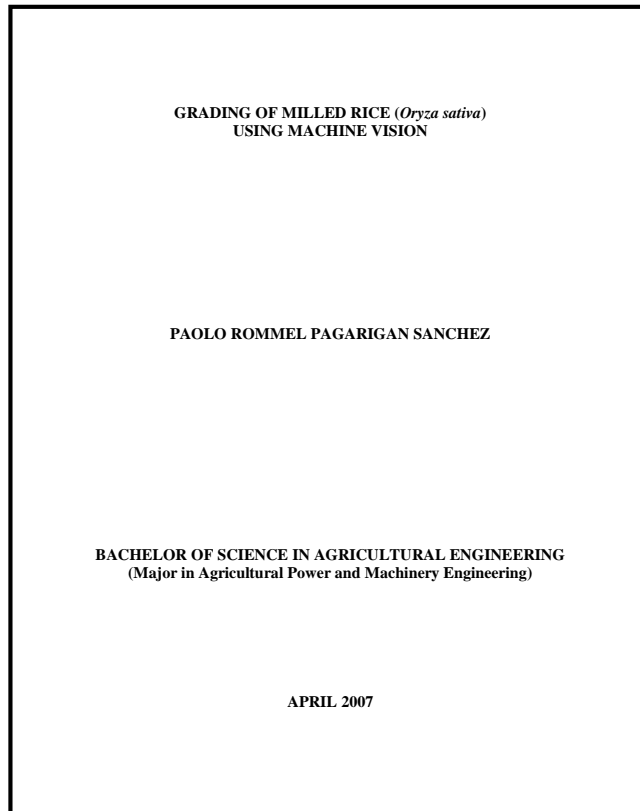
Bachelor of Science in Industrial Engineering

(k) The date of manuscript submission shall correspond to the month and year when the numerical grade of the student in his or her thesis or field practice is submitted by his or her adviser to the College Secretary's Office (CSO). It shall be written in uppercase letters and center-aligned in the page (e.g. 1st semester- DECEMBER 2015; 2nd semester- JUNE 2016; Mid Year- JULY 2016). This date should be positioned about two (2) inches above the bottom edge of the front cover.

(l) Pattern 2.4:



(l) Example 2.4:



Section 2.5. Design and Layout of the Manuscript Spine

(a) The manuscript spine shall contain the following information:

First letter of the author's surname

Acronym of the degree

Surname and initials of the author

Year of manuscript submission

(b) The top and bottom edges of the spine shall be bordered by two gold lines as indicated in Pattern 2.5

(c) The first letter of the author's surname shall be bordered by two gold lines positioned one (1) inch below the top edge of the spine. The letter should be centered between these lines and the lines at the top edge of the spine (see Pattern 2.5).

(d) The acronym of the degree (BS__) should be positioned about two (2) inches below the top edge of the spine.

(e) For consistency, the following terms shall be used to indicate the acronym of the different degrees:

BSAE for BS in Agricultural Engineering

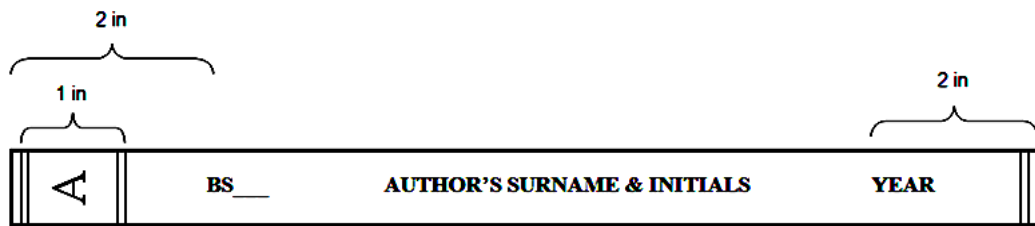
BSABE for BS in Agricultural and Biosystems Engineering

BSChE	for BS in Chemical Engineering
BSCE	for BS in Civil Engineering
BSEE	for BS in Electrical Engineering
BSIE	for BS in Industrial Engineering

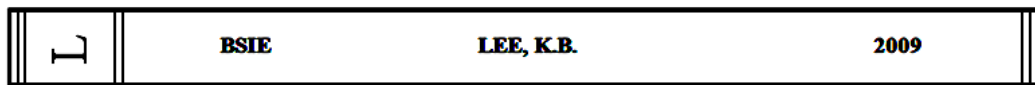
(f) The year of manuscript submission should be positioned about two (2) inches above the bottom edge of the spine.

(g) The author's name shall be written in reverse, surname first, followed by a comma, first name initials and middle initial. It shall be in uppercase letters, and centered between the acronym of the degree and the year of manuscript submission.

(h) Pattern 2.5:



(i) Example 2.5:



ARTICLE 3 PRELIMINARY PAGES

Section 3.1. Contents of the Preliminary Pages

(a) The preliminary pages for thesis manuscripts (arranged according to their order of presentation) include the following:

TITLE PAGE
APPROVAL PAGE
BIOGRAPHICAL SKETCH
ACKNOWLEDGMENT
TABLE OF CONTENTS
LIST OF TABLES
LIST OF FIGURES
LIST OF APPENDICES
LIST OF APPENDIX TABLES
LIST OF APPENDIX FIGURES
ABSTRACT

(b) The preliminary pages for field practice and special problem manuscripts (arranged according to their order of presentation) include the following:

TITLE PAGE
APPROVAL PAGE
BIOGRAPHICAL SKETCH
ACKNOWLEDGMENT
TABLE OF CONTENTS
LIST OF TABLES
LIST OF FIGURES
LIST OF APPENDICES
LIST OF APPENDIX TABLES
LIST OF APPENDIX FIGURES
EXECUTIVE SUMMARY

(c) Each preliminary page shall be started on a new page, regardless of the space left in the previous page.

Section 3.2. Title Page

(a) The title page shall contain the following information:

Thesis, ~~or~~ field practice **or special problem** title

Full name of the author

Statement of submission

Degree

Major

Date of manuscript submission

Statement of manuscript content disclosure

(b) All the items found in title page shall be presented in bold letters.

(c) The title shall be in uppercase letters (except for scientific names), center-aligned in the page and shall be laid out in an inverse pyramid manner. The first line of the title shall be positioned at the topmost line of the page.

(d) For titles containing names of places in the PHILIPPINES, the term "PHILIPPINES" should be added after the name of the place. The level of citing the place shall include city/municipality, followed by province, then PHILIPPINES. For titles already containing the word "PHILIPPINES" such as company names or institutions, then the word "PHILIPPINES" may not be again written to avoid redundancy. In this case the place to be written in the title is up to province only. If a well-known company or institution has no other branches, then only "PHILIPPINES" will be included in the title (city/municipality and province is not necessary at all). The members of the guidance committee shall ensure that this provision is strictly followed.

(e) For titles containing scientific names of organisms, the author shall secure a certification from the Museum of Natural History (MNH-UPLB) **at least five (5) working days prior to submission to the guidance committee. The certification shall state** the accepted and correct scientific name of the organism. The certification must be included as part of the Appendix. Furthermore, the author shall follow the recommendation of the MNH on how the scientific name should be written and positioned in the title and in the body of the manuscript. Scientific names should only be written when the object of the study pertains to plants, animals or bio-material/products. The members of the guidance committee shall ensure that this provision is strictly followed.

(f) For titles containing company names or institution, only the acronym of the company or institution should be written on the FRONT COVER. The spelled out acronym followed by the acronym itself enclosed in a parenthesis shall be included in **ABSTRACT/EXECUTIVE SUMMARY.**

(g) The author's name shall be written in full, first name first, followed by middle name (not middle initial), and then surname. It shall be presented in uppercase letters, center-aligned in the page, and in single line only. The author's name shall be positioned about 10 spaces below the first line of the title.

(h) The statement of submission shall be in uppercase letters, center-aligned in the page and stated according to the format and layout illustrated in Pattern 3.2.1. The first line in the statement of submission shall be positioned about 5 spaces below the name of the author.

(i) Pattern 3.2.1:

SUBMITTED TO THE FACULTY OF

 DEPARTMENT OR INSTITUTE
 COLLEGE OF ENGINEERING AND AGRO-INDUSTRIAL TECHNOLOGY
 UNIVERSITY OF THE PHILIPPINES LOS BAÑOS
 IN PARTIAL FULFILLMENT OF THE
 REQUIREMENTS FOR THE
 DEGREE OF

(j) For BSAE/BSABE students, the blank line in Pattern 3.2.1 shall correspond to the academic division where the author belongs. For consistency, the following names shall be used to indicate the divisions:

AGRICULTURAL AND BIO-PROCESS DIVISION
 AGRICULTURAL MACHINERY DIVISION
 AGROMETEOROLOGY AND FARM STRUCTURES DIVISION
 LAND AND WATER RESOURCES DIVISION

(k) For non-BSAE/BSABE students, the blank line in Pattern 3.2.1 shall be omitted in the statement of submission.

(l) The degree shall be written in full, (e.g. BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING not B.S. ELECTRICAL ENGINEERING nor BS ELECTRICAL ENG'G), in uppercase letters, center-aligned in the page, and in single line only. The degree shall be positioned about eight (5) spaces below the last line of the statement of submission.

(m) The major shall be written below the degree, in title case (i.e. the first letter of all significant words capitalized), and center-aligned in the page. The major shall be enclosed in parenthesis and shall be introduced by the phrase "Major in" followed by the major.

(n) For consistency, the following terms shall be used to indicate the major of the author:

(n.1) Majors for BS Agricultural Engineering / Agricultural and Biosystems Engineering

- Agricultural Power and Machinery Engineering
- Agricultural and Bio-Process Engineering
- Land and Water Resources Engineering
- Structures and Environment

(n.2) Majors for BS Chemical Engineering

- Sugar Technology

- Pulp and Paper Technology

(n.3) Majors for BS Electrical Engineering

- Power Engineering
- Electronics Engineering
- Computer Engineering

(o) The line for the major shall be omitted for students under the following curricula:

Bachelor of Science in Chemical Engineering (General Curriculum)

Bachelor of Science in Civil Engineering

Bachelor of Science in Industrial Engineering

(p) The date of manuscript submission shall correspond to the month and year when the numerical grade of the student in his or her thesis or field practice is submitted by his or her adviser to the office of the college secretary. It shall be written in uppercase letters and center-aligned in the page (e.g. 1st semester- DECEMBER 2015; 2nd semester- JUNE 2016; Mid Year- JULY 2016).

(q) An additional portion on the title page should indicate who can have access to the thesis/field practice manuscript (see Pattern 3.2.2). The instruction should adhere to the requirements of the college librarians who will also be subjected to non-disclosure agreements. The author and the adviser should decide on the access level of the manuscript and should sign on the space provided after the instruction. Only one access level shall be answered with "YES". A dash "-" should be indicated in the other access levels.

(r) Pattern 3.2.2:

This thesis/field practice manuscript can be accessed:

By the general public	-
Only after consultation with the author/thesis adviser	-
Only by those bound by confidentiality agreement	Yes

Signature of Student: _____

Signature of Thesis adviser: _____

(s) The title page shall have an imaginary page number.

(t) Pattern 3.2.3:

**TITLE IN UPPERCASE AND BOLD LETTERS
INVERSE PYRAMID STYLE ¶**

¶
¶
¶
¶
¶
¶
¶

AUTHOR'S FULL NAME

¶
¶
¶
¶

SUBMITTED TO THE FACULTY OF

**DEPARTMENT OR INSTITUTE
COLLEGE OF ENGINEERING AND AGRO-INDUSTRIAL TECHNOLOGY
UNIVERSITY OF THE PHILIPPINES LOS BAÑOS
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE
DEGREE OF**

¶
¶
¶
¶

BACHELOR OF SCIENCE IN _____ ENGINEERING
(Major in _____)

¶
¶
¶
¶

MONTH AND YEAR OF MANUSCRIPT SUBMISSION

¶
¶

This thesis/field practice/special problem manuscript can be accessed:

By the general public	-
Only after consultation with the author/thesis adviser	-
Only by those bound by confidentiality agreement	Yes

Signature of Student: _____
Signature of Adviser: _____

(u) Example 3.2:

DESIGN, FABRICATION AND PERFORMANCE EVALUATION
OF A BACKYARD-SCALE AIRLIFT
AQUAPONIC SYSTEM

JEFFREY AGUILAR GONZALES

SUBMITTED TO THE FACULTY OF
LAND AND WATER RESOURCES DIVISION
INSTITUTE OF AGRICULTURAL ENGINEERING
COLLEGE OF ENGINEERING AND AGRO-INDUSTRIAL TECHNOLOGY
UNIVERSITY OF THE PHILIPPINES LOS BAÑOS
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE
DEGREE OF

BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING
(Major in Land and Water Resources Engineering)

OCTOBER 2010

This thesis manuscript can be accessed:

By the general public	-
Only after consultation with the author/thesis adviser	-
Only by those bound by confidentiality agreement	Yes

Signature of Student: _____
Signature of Adviser: _____

Section 3.3. Approval Page

(a) The title “APPROVAL PAGE” shall not appear anywhere in the page.

(b) The approval page shall be introduced by a paragraph stating that the manuscript is accepted by a hierarchy of signatories. Such paragraph shall contain the following information, presented in uppercase and bold letters:

- Thesis or field practice title
- Full name of the author
- Degree

(c) The first line of the introductory paragraph shall be indented ½ inch to the right. The paragraph shall be in double space and shall be written according to the format illustrated in Pattern 3.3.1.

(d) Pattern 3.3.1:

The (thesis or field practice report) attached hereto, entitled “**THESIS, FIELD PRACTICE OR SPECIAL PROBLEM TITLE**” prepared and submitted by **AUTHOR’S FULL NAME**” in partial fulfillment of the requirements for the degree of **DEGREE** is hereby accepted.

(e) Example 3.3.1:

The thesis attached hereto, entitled “**SIZE GRADING OF BANANA USING MACHINE VISION**” prepared and submitted by **MARVIN CARPENA PETINGCO** in partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL ENGINEERING** is hereby accepted.

(f) The format and layout for the space where the signatories shall sign are illustrated in Pattern 3.3.2.

(g) Pattern 3.3.2:

FULL NAME OF SIGNATORY

Designation

Guidance Committee or Office

Date Signed

(h) The name of the signatory shall be written in full (with middle initial) and in uppercase and bold letters. For consistency, titles like “Prof.”, “Engr.”, “Dr.”, “Mr.”, “Ph.D.”, etc, shall not be included in the signatory’s name.

(i) For consistency, the following terms shall be used to indicate the designation of the signatory.

Member	(for panel members)
Adviser and Chair	(for advisers and guidance committee chairs)
Co-Adviser	(for co-advisers)
Chair	(for division chairs and department chairs)
Director	(for institute director)
Dean	(for college dean)

(j) The line above the name of the signatory shall be kept similar in length for all the signatories. If possible, the length of such line should be equal to the length of the name of the signatory with the longest name. The name and designation of the signatory shall be center-aligned relative to this line.

(k) To illustrate the format prescribed by the preceding paragraphs, Examples 3.3.2 to 3.3.7 should be considered.

(l) Example 3.3.2: (Panel Member)

STEPHEN S. DOLIENTE

Member
Guidance Committee

Date Signed

(m) Example 3.3.3: (Adviser)

PERLIE P. VELASCO

Adviser and Chair
Guidance Committee

Date Signed

(n) Example 3.3.4: (Division Chair)

RONALDO B. SALUDES

Chair
Agrometeorology and Farm Structures Division

Date Signed

(o) Example 3.3.5: (Department Chair)

KAREN-CHRISTIAN C. AGNO

Chair
Department of Electrical Engineering

Date Signed

(p) Example 3.3.6: (Institute Director)

FERNANDO O. PARAS, Jr.

Director
Institute of Agricultural Engineering

Date Signed

(q) Example 3.3.7: (College Dean)

ARNOLD R. ELEPAÑO
 Dean
 College of Engineering and Agro-Industrial Technology

 Date Signed

(r) The names of the signatories shall be arranged and laid out according to the format illustrated in Pattern 3.3.3 and Pattern 3.3.4.

(s) Pattern 3.3.3: (3-Member Panel – BSAE/BSABE)

The (thesis, field practice or special problem report) attached hereto, entitled “**THESIS, FIELD PRACTICE OR SPECIAL PROBLEM TITLE**” prepared and submitted by **AUTHOR’S FULL NAME**” in partial fulfillment of the requirements for the degree of **DEGREE** is hereby accepted.



FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Adviser and Chair
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Chair
 Academic Division

 Date Signed

FULL NAME OF SIGNATORY

Director
 Institute of Agricultural Engineering

 Date Signed

FULL NAME OF SIGNATORY

Dean
 College of Engineering and Agro-Industrial Technology

 Date Signed

(t)Pattern 3.3.3: (3-Member Panel – non- BSAE/BSABE)

The (thesis, field practice or special problem report) attached hereto, entitled “**THESIS, FIELD PRACTICE OR SPECIAL PROBLEM TITLE**” prepared and submitted by **AUTHOR’S FULL NAME**” in partial fulfillment of the requirements for the degree of **DEGREE** is hereby accepted.



FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Adviser and Chair
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Chair
 Department

 Date Signed

FULL NAME OF SIGNATORY

Dean
 College of Engineering and Agro-Industrial Technology

 Date Signed

(u) Pattern 3.3.4: (4-Member Panel – BSAE/BSABE)

The (thesis, field practice or special problem report) attached hereto, entitled “**THESIS, FIELD PRACTICE OR SPECIAL PROBLEM TITLE**” prepared and submitted by **AUTHOR’S FULL NAME**” in partial fulfillment of the requirements for the degree of **DEGREE** is hereby accepted.



FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Adviser and Chair
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Chair
 Academic Division

 Date Signed

FULL NAME OF SIGNATORY

Director
 Institute of Agricultural Engineering

 Date Signed

FULL NAME OF SIGNATORY

Dean
 College of Engineering and Agro-Industrial Technology

 Date Signed

(v) Pattern 3.3.4: (4-Member Panel – non-BSAE/BSABE)

The (thesis, field practice or special problem report) attached hereto, entitled “**THESIS, FIELD PRACTICE OR SPECIAL PROBLEM TITLE**” prepared and submitted by **AUTHOR’S FULL NAME**” in partial fulfillment of the requirements for the degree of **DEGREE** is hereby accepted.



FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Member
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Adviser and Chair
 Guidance Committee

 Date Signed

FULL NAME OF SIGNATORY

Chair
 Department

 Date Signed

FULL NAME OF SIGNATORY

Dean
 College of Engineering and Agro-Industrial Technology

 Date Signed

(w) The approval page shall have an imaginary page number.

Section 3.4. Biographical Sketch

(a) The title "BIOGRAPHICAL SKETCH" shall be positioned at the topmost line of the page, center aligned and in uppercase and bold letters.

(b) Four (4) spaces shall be maintained between the title and the first line of the first paragraph. The lines shall be double spaced and no spacing between paragraphs.

(c) The biographical sketch shall be limited to one (1) page only.

(d) Preferably, the biographical sketch should be in English and written in the third person point of view.

(e) A colored, **half-body** studio photo of the author, wearing **corporate** attire (**e.g. for male: coat and tie; for female: blouse and blazer**) with white background, should be included in the biographical sketch. The photo shall be **3"** high and **2"** wide and shall be text-wrapped at the upper right portion of the first paragraph of the biographical sketch (see Pattern 3.4).

(f) The full name of the author, in uppercase letters, shall appear four (4) spaces below the last line of the last paragraph. Such name shall be flushed to the right margin. The author shall sign above his or her name attesting to the accuracy of the information included in the biographical sketch.

(g) Pattern 3.4:

(e) Preferably, the acknowledgment should be in pure English. However, Filipino words may be used provided that they will be italicized or enclosed in quotations marks as they appear in the text.

(f) The acknowledgment may be written in first or third person point of view.

(g) Pictures or figures of any kind are prohibited in the acknowledgment. Likewise, inappropriate colloquial words are not permitted.

(h) Pattern 3.5:

ACKNOWLEDGMENT

¶
¶
¶

page

Section 3.6. Table of Contents

(a) The title “TABLE OF CONTENTS” shall be positioned at the topmost line of the page, center aligned and in uppercase and bold letters.

(b) Two (2) columns shall be created where the items and their corresponding page numbers are listed. The first column shall contain the list of the items to be included and such column shall not contain any heading. All the contents of the first column shall be flushed to the left margin.

(c) The second column shall contain the heading “PAGE”, underlined and in uppercase letters. This heading shall be four (4) spaces below the line containing the title “TABLE OF CONTENTS.”

(d) The first item in the list (e.g. TITLE PAGE) shall be three (3) spaces below the line containing the heading "PAGE".

(e) Dots or dashes connecting the items to their corresponding page numbers shall be omitted.

(f) Page numbers shall be listed under and "centered" relative to the heading "PAGE".

(g) Example 3.6.1:

TABLE OF CONTENTS	
	¶ ¶ ¶
	<u>PAGE</u>
TITLE PAGE	¶ I
APPROVAL PAGE	Ii
BIOGRAPHICAL SKETCH	iii
ACKNOWLEDGMENT	iv
TABLE OF CONTENTS	vi

(h) Double spaces shall be maintained between entries but single space should be maintained within entries.

(i) The headings and sections to be listed in the table of contents shall have the same case formatting as what is found and prescribed in the text.

(j) Major subsections shall be indented ½ inch to the right reckoned from the main heading. Likewise, minor subsections shall be indented ½ inch to the right relative to the major subsection. Paragraph headings shall be indented ½ inch to the right relative to the minor subsection.

(k) Example 3.6.2:

REVIEW OF LITERATURE	10
2.1 Pumps	10
2.2 Performance Testing of Pump Set Components	17
Pump Efficiency	17
Measurement and Instrumentation	19
Head measurement	19
Discharge measurement	24

(l) Usually, the “TABLE OF CONTENTS” exceeds one page, and in such cases, the list shall be continued in succeeding pages and the line containing the heading “PAGE” shall still appear in each page.

(m) Example 3.6.3:

	<u>PAGE</u>
	¶
	¶
3.12 Statistical Analysis	29
4. RESULTS AND DISCUSSION	30
4.1 Load Cell and Circuit Calibration	30
4.2 Comparison of Penetrometer Readings	33

(n) Only the title “TABLE OF CONTENTS” shall be bold and the remaining entries and page numbers shall be in their regular formatting.

Section 3.7. List of Tables, List of Figures, List of Appendices List of Appendix Tables, List of Appendix Figures

(a) Tables and figures presented in the main text shall appear in the “LIST OF TABLES” and “LIST OF FIGURES”, respectively.

(b) Tables and figures considered to be part of the appendices shall be listed in the "LIST OF APPENDIX TABLES" and "LIST OF APPENDIX FIGURES", respectively. Likewise, all appendices shall be listed under the "LIST OF APPENDICES."

(c) The five lists enumerated in the preceding paragraphs have similar formats which are stated in subsequent paragraphs.

(d) The title of the list (e.g. "LIST OF TABLES") shall be positioned at the topmost line of the page, center aligned and in uppercase and bold letters.

(e) Three columns shall be created where the items and their corresponding page numbers are listed. The first column shall contain the number (for tables and figures) or letter (for appendices) of the items to be included. This column shall contain the appropriate heading ("TABLE", "FIGURE", "APPENDIX", "APPENDIX TABLE", "APPENDIX FIGURE"), underscored and in uppercase letters.

(f) The second column shall contain the list of the items to be included and such column shall not contain any heading. All the contents of the second column shall be flushed to the left margin of that column.

(g) The third column shall contain the heading "PAGE", underscored and in uppercase letters. The headings shall be four (4) spaces below the line containing the title of the list.

(h) The first item in the list shall be three (3) spaces below the line containing the column headings

(i) Example 3.7.1:

LIST OF TABLES		
<u>TABLE</u>		<u>PAGE</u>
1-1	Visual description of the three sampling sites	30
1-2	Analysis of variance table	40
2-3	Water quality analysis of the three sampling sites	46

(j) Dots or dashes connecting the items to their corresponding page numbers shall be omitted.

(k) Table or figure numbers or appendix letters shall be listed under and "centered" relative to their respective headings. Likewise, page numbers shall be listed under and "centered" relative to the heading "PAGE".

(l) Double spaces shall be maintained between entries but single space should be maintained within entries.

(m) In cases where the items or titles are too long, they shall be cut in such a way that the top line is always longer than the succeeding lines.

(n) The headings and sections to be listed in the list shall have the same case formatting as what is found and prescribed in the text.

(o) Example 3.7.2:

<u>APPENDIX</u>		<u>PAGE</u>
		¶
A	Details of Statistical Analysis	57
.	.	.
H	Computations for Power Consumption	89
I	Procedure for Moisture Content Determination	91
	page	

(p) In cases where the list exceeds one page, it shall be continued in succeeding pages and the line containing the column headings shall still appear in each page.

(q) Example 3.7.3:

<u>APPENDIX</u>		<u>PAGE</u>
<u>FIGURE</u>		
		¶
21	Proposed lay-out of the greenhouse plots	57
22	Instruments used	91

(r) Only the list titles shall be bold and the remaining entries and page numbers shall be in their regular formatting.

Section 3.8. Abstract or Executive Summary

(a) The title “ABSTRACT” or “EXECUTIVE SUMMARY” shall be positioned at the topmost line of the page, center aligned and in uppercase and bold letters.

(b) The abstract or executive summary shall be introduced by a paragraph describing the publishing details of the manuscript. Such paragraph shall contain the following information, with their corresponding formatting:

Author’s full name (surname first, followed by first name and middle name; in uppercase and bold)

College

University

Month and year of manuscript submission

Title of thesis, field practice or special problem

(in title case and bold with complete meaning of acronyms written on the FRONT COVER followed by the acronym written inside an open and close parenthesis)

(c) The items enumerated in the previous paragraph shall appear according to their order in the list. Furthermore, they shall be separated by period, followed by a space.

(d) The first line of the introductory paragraph shall be flushed to the left margin of the page and positioned four (4) spaces below the title “ABSTRACT” or “EXECUTIVE SUMMARY”. The paragraph shall be in single space and shall be written according to the format illustrated in Pattern 3.8.1.

(e) Pattern 3.8.1:

AUTHOR’S NAME (LAST, FIRST MIDDLE). College of Engineering and Agro-Industrial Technology, University of the Philippines Los Baños. Month and Year of Manuscript Submission. **Title of Thesis, Field Practice or Special Problem Manuscript.**

(f) Example 3.8:

BALDOZ, MARK ANTHONY MABILANGAN. College of Engineering and Agro-Industrial Technology, University of the Philippines Los Baños. April 2009. Multiple Job Scheduling of the Nine New Products of KZ Step1 Model at the Metal Fabrication Division of Roberts Automotive and Industrial Manufacturing Corporation, Cabuyao, Laguna, **Philippines.**

(g) The name of the major adviser (first, middle initial, last), in title case and flushed in the left margin of the page, shall be indicated three (3) spaces below the introductory paragraph. Titles like “Prof.”, “Engr.”, “Dr.” shall be included in the adviser’s full name. The name shall be introduced by the phrase “Major Adviser:”.

(h) For the thesis, the abstract shall not be more than 250 words and shall be written in third person point of view.

(i) For the Field Practice and Special Problem, the executive summary shall not be more than 350 words and shall be written in third person point of view.

(j) The abstract or executive summary shall be double-spaced and limited to one paragraph only. The first line of the paragraph shall be indented ½ inch to the right and shall start three (3) spaces below the line containing the name of the major adviser.

(k) Pattern 3.8.2:

ABSTRACT

¶
¶
¶

AUTHOR'S NAME (LAST, FIRST MIDDLE). College of Engineering and Agro-Industrial Technology, University of the Philippines Los Baños. Month and Year of Manuscript Submission.
Title of Thesis, Field Practice or Special Problem Manuscript.

¶
¶
Major Adviser: Prof. _____

¶
¶

page

Section 4.1. General Guidelines

(a) As a general rule, the discussions in the main text (i.e. INTRODUCTION to RECOMMENDATIONS) shall be written in the third person point of view.

(b) The first line of the paragraph shall be indented ½ inch to the right. The paragraph shall be aligned in both left and right margins (justified). Double spaces shall be maintained between lines and between paragraphs.

(c) To have a neat presentation of ideas, unnecessary marks and symbols in paragraphs shall be avoided. An underscore (underline) shall not be used when defining terms and when emphasizing ideas.

Section 4.2. Text Structure

(a) If possible, only three levels of subsections (major subsection, minor subsection and paragraph headings) should be maintained.

(b) The major subsection shall be positioned at the center of the page, in bold letters, and with the first letter of all significant words capitalized. If the major subsection is composed of five or more words, it shall be arranged in an inverted pyramid form, in single space. Four (4) spaces shall be maintained between the main heading and the first line of the major subsection.

(c) The minor subsection shall be placed three (3) spaces below the major subsection. It shall be positioned at the left side of the page, in bold letters with the first letter of all significant words capitalized. When it runs more than half the page, it shall be cut off with longer line at the top, and flush to the left margin in single spaced.

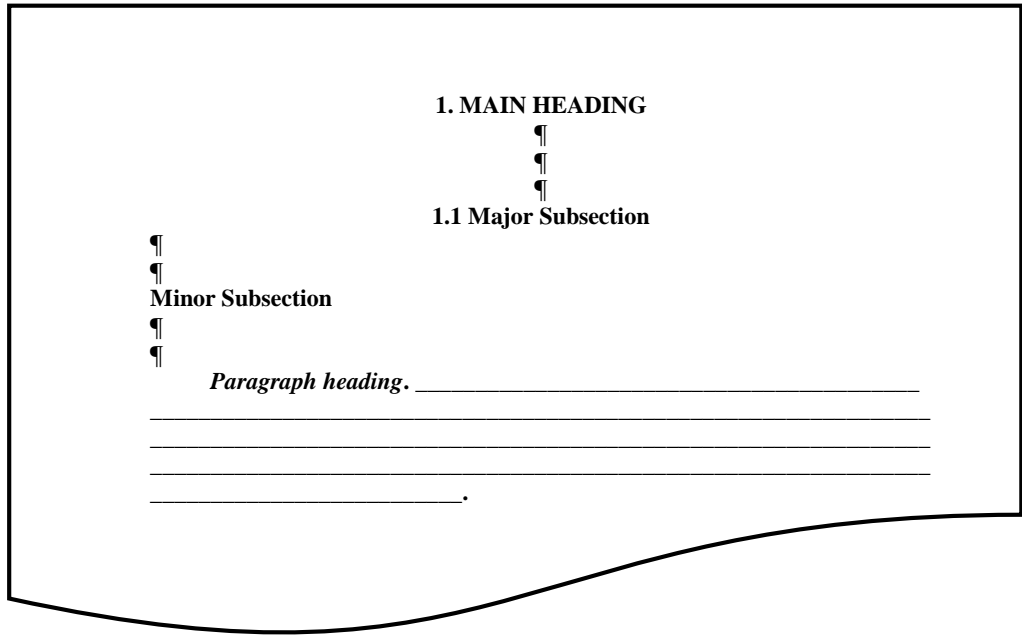
(d) Paragraph headings shall be indented ½ inch to the right followed by a period. The paragraph immediately follows after two (2) spaces.

(e) Paragraph headings shall be bold and italicized with only the first letter of the first word capitalized (sentence case).

(f) The paragraph heading shall be three (3) spaces below the minor subsection.

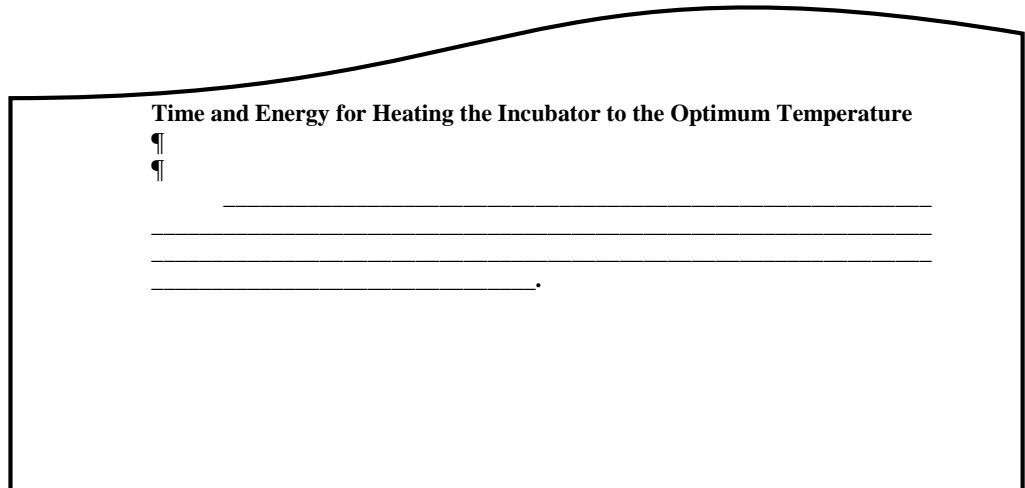
(g) To fully illustrate the format concerning textual presentation, the following structure shall be adopted throughout the text:

(h) Pattern 4.2:



(i) Example 4.2:

Original:



Preferred:

**Time and Energy for Heating the Incubator
to the Optimum Temperature**

¶
¶

_____.

Section 4.3. Main Heading

(a) The preferred main headings for thesis manuscripts correspond to the different chapters of the main text. These include:

1. INTRODUCTION
2. REVIEW OF LITERATURE
3. MATERIALS AND METHODS
4. RESULTS AND DISCUSSION
5. SUMMARY AND CONCLUSION
6. RECOMMENDATIONS
7. REFERENCES

(b) For field practice manuscripts, the preferred main headings are, but not limited to:

1. INTRODUCTION
2. THEORETICAL BACKGROUND
3. DESCRIPTION OF THE FIELD PRACTICE SITE
4. ACTIVITIES UNDERTAKEN DURING THE FIELD PRACTICE
5. TECHNICAL KNOWLEDGE AND EXPERIENCES GAINED
6. PROBLEMS ENCOUNTERED
7. RECOMMENDATIONS
8. REFERENCES

(c) For special problem manuscripts, the preferred main headings are, but not limited to:

1. INTRODUCTION
2. REVIEW OF LITERATURE/THEORETICAL BACKGROUND
3. MATERIALS AND METHODS
4. RESULTS AND DISCUSSION
5. SUMMARY AND CONCLUSION
6. RECOMMENDATIONS
7. REFERENCES

(d) Each chapter shall be started on a new page, regardless of the space left on the previous page.

(e) The main headings shall be positioned at the topmost line of the page, center aligned and in uppercase and bold letters. Main headings should be numbered according to the lists in Section 4.3(a) and Section 4.3(b).

Section 4.4. Major Subsection

(a) For thesis and special problem manuscripts, the preferred major subsections for the INTRODUCTION are, but not limited to:

- 1.1 Background of the Study
- 1.2 Significance of the Study
- 1.3 Objectives of the Study
- 1.4 Scope and Limitations of the Study
- 1.5 Time and Place of the Study

(b) "Statement of the Problem" can also be included in the INTRODUCTION.

(c) For field practice manuscripts, the preferred major subsections for the INTRODUCTION are, but not limited to:

- 1.1 Background of the Field Practice
- 1.2 Significance of the Field Practice
- 1.3 Objectives of the Field Practice
- 1.4 Scope and Limitations of the Field Practice
- 1.5 Time and Place of the Field Practice

(d) Major subsections should be numbered according to the lists in Section 4.4(a) and Section 4.4(c). Major subsections vary depending on the chapter where they belong. However they shall be formatted according to the provisions of this article.

ARTICLE 5 TABLE PRESENTATION

Section 5.1. Table Structure and Format

(a) To fully illustrate the format concerning table presentation, the following table structure shall be adopted throughout the manuscript:

(b) Pattern 5.1:

FIRST LEVEL HEADING				
FIRST LEVEL HEADING	FIRST LEVEL HEADING (unit)	Second Level Heading		Second Level Heading (unit)
		third level heading (unit)	third level heading (unit)	
Row Heading 1				
Row Heading 2				
Row Heading 3				
Row Heading 4				
Row Heading 5				

(c) Tables shall not contain side boxes, instead they shall be presented with double solid lines as top and bottom borders.

(d) The use of too many lines in the table should be avoided. Single solid horizontal lines should be used to separate the different rows and to separate the headings from the entries.

(e) First level headings shall be in uppercase letters. Significant words in the second level headings shall have their first letters capitalized. All third level headings shall have lowercase letters except for proper nouns and acronyms. Dimensions and units are exceptions to these rules, i.e. they shall be presented in their proper formats and symbols, enclosed in parentheses.

Section 5.2. Table Number and Title

(a) Tables shall be numbered consistently and continuously, independent of the numbering of figures and the numbering of equations.

(b) Table numbers are composed of two numbers separated by a dash. The first number corresponds to the number of the chapter where the table belongs while the second number corresponds to the number of the table as it appears in the chapter.

(c) Table titles shall be preceded by the label "Table X-X" (not "Tab. X-X") followed by a period. The title immediately follows after 2 spaces. Similarly, tables considered as appendix tables shall be continuously and consistently labelled as "Appendix Table ____."

(d) The table title shall be placed at the top of the table and shall be in sentence case (i.e. only the first letter of the first word is capitalized, and the whole title is followed by a period). A single space shall be maintained between the last line of the table title and the top double line border of the table.

(e) The table title shall be positioned relative to the table and not relative to the page. For consistency, the table title, including the label "Table X-X." shall be aligned to the left edge of the table.

(f) In any case, the table title shall not extend beyond the table's width. If the title length exceeds the table's width, the title shall be cut off, and the remaining part is aligned to the start of the title (not the label), in single space.

(g) Example 5.2.1:

Table 4-6. Hourly power consumption of different incubator components using two methods of incubation.

COMPONENT	CONVENTIONAL		SOLAR AIDED	
	Nominal Consumption (kWh)	Actual Consumption (kWh)	Nominal Consumption (kWh)	Actual Consumption (kWh)

(h) For continued tables, there is no need to indicate the table title, instead use "Table X-X continued . . ." or "Appendix Table __ continued . . ." However, table headings with proper heading and border formats shall be provided.

(i) Example 5.2.2:

Appendix Table 4. Raw and computed data for ventilation rate calculation.

DATE	TIME	AMBIENT				POULTRY HOUSE			
		Dry Bulb (°C)	Wet Bulb (°C)	RH (%)	Enthalpy (kJ/kg)	Ave Temp (°C)	Ave RH (%)	Enthalpy (kJ/kg)	Specific Volume (m ³ /kg)
24-Aug-07	7:00 PM	29.0	25.0	72.6	76.32	38.4	62.1	108.16	0.921
24-Aug-07	8:00 PM	28.5	24.0	69.1	72.19	38.2	57.5	102.56	0.918

Appendix Table 4 continued . . .

DATE	TIME	AMBIENT				POULTRY HOUSE			
		Dry Bulb (°C)	Wet Bulb (°C)	RH (%)	Enthalpy (kJ/kg)	Ave Temp (°C)	Ave RH (%)	Enthalpy (kJ/kg)	Specific Volume (m ³ /kg)
25-Aug-07	11:00 PM	26.5	23.0	74.5	68.30	38.5	60.3	106.31	0.920
25-Aug-07	12:00 AM	26.0	23.0	77.7	68.32	38.3	60.9	106.50	0.920

Section 5.3. Format of Table Entries

(a) All entries, including headings, shall be single-spaced within a cell and shall be centered vertically.

(b) If possible, entries should also be centered horizontally. However, phrases are preferably flushed to the left margin.

(c) Consistency on the format of values and entries shall be observed. In a column or row populated by numerical values, the number of decimal places shall be the same in each cell, depending on the desired accuracy.

(d) Example 5.3:

Table 4-13. Empirical heating values of seaweed samples at various moisture contents.

MOISTURE CONTENT (%)	HEATING VALUE (kJ/kg)		
	Roxas City Samples	Ivisan Samples	Pilar Samples
22	9406.76	9927.24	10174.00
26	8923.08	9486.92	9744.00
30	8439.40	9046.60	9314.00
34	7955.72	8606.28	8884.00
38	7472.04	8165.96	8454.00

(e) Fractional and decimal values shall not be mixed in the same column or row.

(f) Units of different systems (i.e. SI and English) shall not be mixed in the same column or row. The values shall be converted from one system to another for consistency.

Section 5.4. Table Footnote and Citation

(a) Footnotes to be included in the table shall be positioned below the bottom double line border, single-spaced and flushed to the left edge of the table.

(b) For tables sourced from references, the source shall be indicated below the bottom double line border (or footnote, if any), flushed to the left edge of the table and in italics. The source shall contain the author and year of publication.

(c) Example 5.4.1:

Table 4-19. Mean water temperature observed at different treatments*.

TREATMENT	TEMPERATURE (°C)	
	Location 1	Location 2
1	38.17	38.98
2	38.49 ^a	38.66
3	38.51 ^a	36.62
4	38.56	38.82
5	38.22	37.72
6	37.93	36.38

*In a column, means followed by the same letter are not significantly different at $p < 0.050$.

(d) Example 5.4.2:

Table 2-2. Selected properties of conventional biomass resources.

TYPES	HEATING VALUE (MJ/kg)	PERCENT MOISTURE	PERCENT ASH
Fruit stems	5.0	63	-
Oil-palm husks	7.0-8.0	55	5.0
Oil-palm fibers	7.0-8.0	55	10.0
Bagasse	7.7-8.0	40-60	1.7-3.8
<i>Phaeophyta</i>	9.0-11.0	-	24.0-45.0
<i>Chlorophyta</i>	8.0-13.0	-	24.0-50.0
Giant Brown Kelp	10.3	-	10.3
Rice Husks	14.0	9	19.0
Maize Cobs	13.0-15.0	10-20	2.0
Coffee husks	16.0	10	0.6
Cocoa husks	13.0-16.0	7-9	7.0-14.0
Wood	8.4-17.0	10-60	0.3-1.7

Source: *Alburo et al., 2010*

Section 5.5. Table Presentation in the Text

(a) Tables can be presented **after** they are mentioned in the text or they could be placed as appendix tables.

(b) Tables shall be positioned at the center of the page. They could be placed along with the text or could be in a separate page. If placed with the text, four (4) spaces shall be maintained between the table title and the last line of the preceding text. Likewise, four (4) spaces shall also be provided between the bottom of the table and the first line of the succeeding text.

(c) Pattern 5.5:

_____ in Table X-__.

Table X- __. _____

FIRST LEVEL HEADING	FIRST LEVEL HEADING (unit)	FIRST LEVEL HEADING		
		Second Level Heading		Second Level Heading (unit)
		third level heading (unit)	third level heading (unit)	
Row Heading 1				
Row Heading 2				
Row Heading 3				
Row Heading 4				
Row Heading 5				

_____.

FIGURE PRESENTATION

Section 6.1. Figure Number and Title

(a) Figures shall be numbered consistently and continuously, independent of the numbering of tables and the numbering of equations.

(b) Figure numbers are composed of two numbers separated by a dash. The first number corresponds to the number of the chapter where the figure belongs while the second number corresponds to the number of the figure as it appears in the chapter.

(c) Figure caption shall be preceded by the label “Figure Y-Y.” (not “Fig. Y-Y”) followed by a period. The caption immediately follows after 2 spaces. Similarly, figures considered as appendix figures shall be continuously and consistently labelled as “Appendix Figure ___.”

(d) The caption shall be placed at the bottom of the figure and shall be in sentence case (i.e. only the first letter of the first word is capitalized, and the whole caption is followed by a period). A single space shall be maintained between the bottom edge of the figure and the first line of the figure caption.

(e) The figure caption shall be positioned relative to the figure and not relative to the page. For consistency, the figure caption, including the label “Figure Y-Y.” shall be center-aligned relative to the figure.

(f) In any case, the whole figure caption shall not extend beyond the figure’s width. If the caption length exceeds the figure’s width, the caption shall be cut off, and the remaining part is aligned to the start of the caption (not the label), in single space.

(g) Example 6.1:



Figure 3-4. Data logger set-up for Bowen ratio measurement.

Section 6.2. Figure Footnote and Citation

(a) Footnotes shall be positioned after the figure caption. It shall be introduced by the term “*Note:*” and the note shall follow after two (2) spaces.

(b) Example 6.2.1:

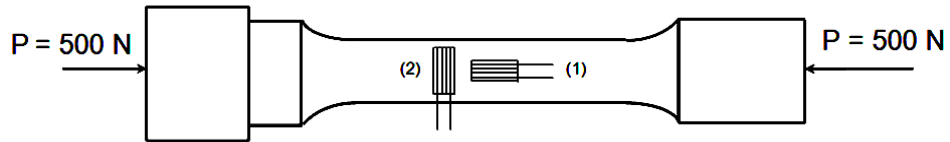


Figure 4-12. Strain gauge positions in the load cell.

Note: Gauges 3 and 4 were positioned at the opposite side of the load cell.

(c) For figures sourced from references, the source shall be indicated below the figure caption (or footnote, if any), aligned to the start of the figure caption and in italics. The source shall contain the author and year of publication.

(d) Example 6.2.2:

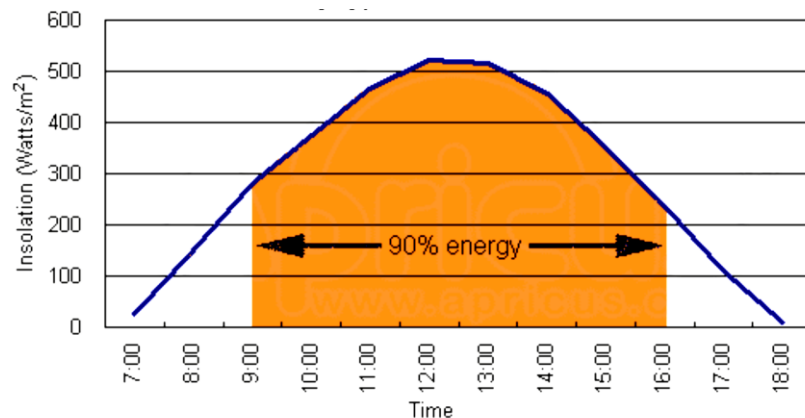


Figure 3-9. Twelve-hour day typical insolation curve.

Source: Apricus, 2006.

Section 6.3. Charts

(a) The most appropriate chart type shall be selected to show the relationship between variables (e.g. line charts should be used when showing trends, bar charts should be used when comparing values, pie charts should be used to show the contribution of each value to a total, etc).

(b) Consistency on the format of graphs shall be observed. All axis labels, axis titles and legend titles shall be formatted to Times New Roman font style.

(c) Axis titles shall be in title case (i.e. the first letter of all significant words are capitalized). Appropriate units, enclosed in parentheses, follow.

(d) In an axis with numerical labels, the number of decimal places shall be the same in each interval, depending on the desired accuracy. Fractional and decimal values shall not be mixed in the same axis.

(e) Preferably, gridlines should be omitted. Legends should be positioned at vacant spaces in the plot area. If the plot area is crowded, the legends may be placed outside the plot area.

(f) Preferably, bar and pie charts should be shaded using hatched lines instead of regular colors. This is to ensure that the variations in the charts are still visible even when the figure is printed in black and white ink.

(g) Equations and R^2 values which are usually included in a scatter chart should be positioned as close as possible to the line or points they described.

(h) Example 6.3.1:

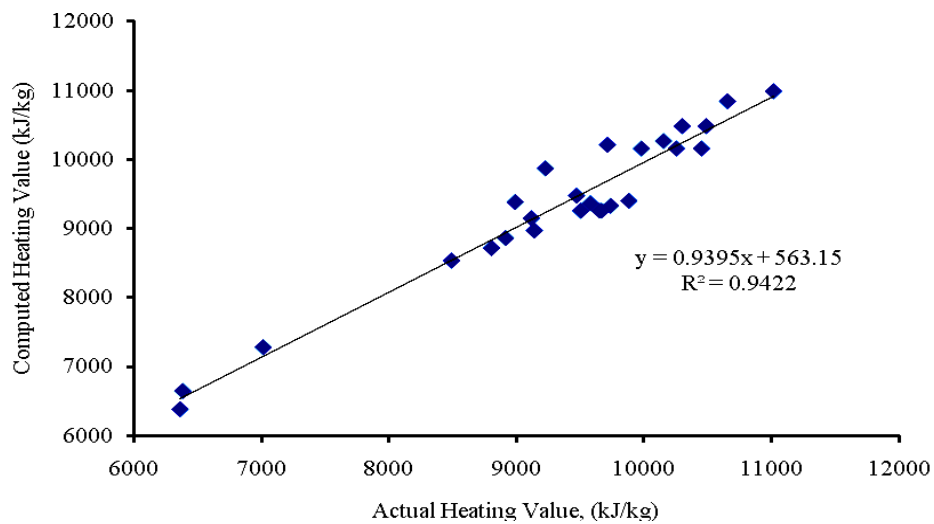


Figure 4-21. Computed heating values vs. actual heating values.

(i) Example 6.3.2:

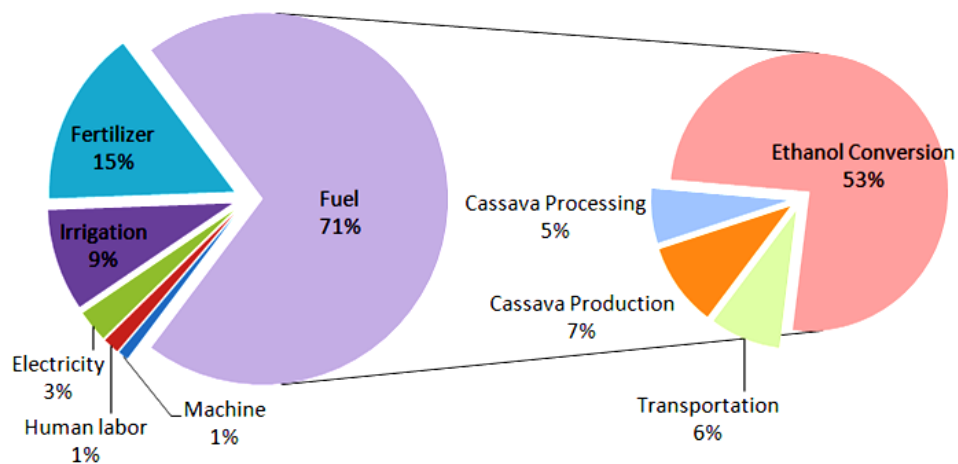


Figure 4-8. Energy inputs for cassava bioethanol production.

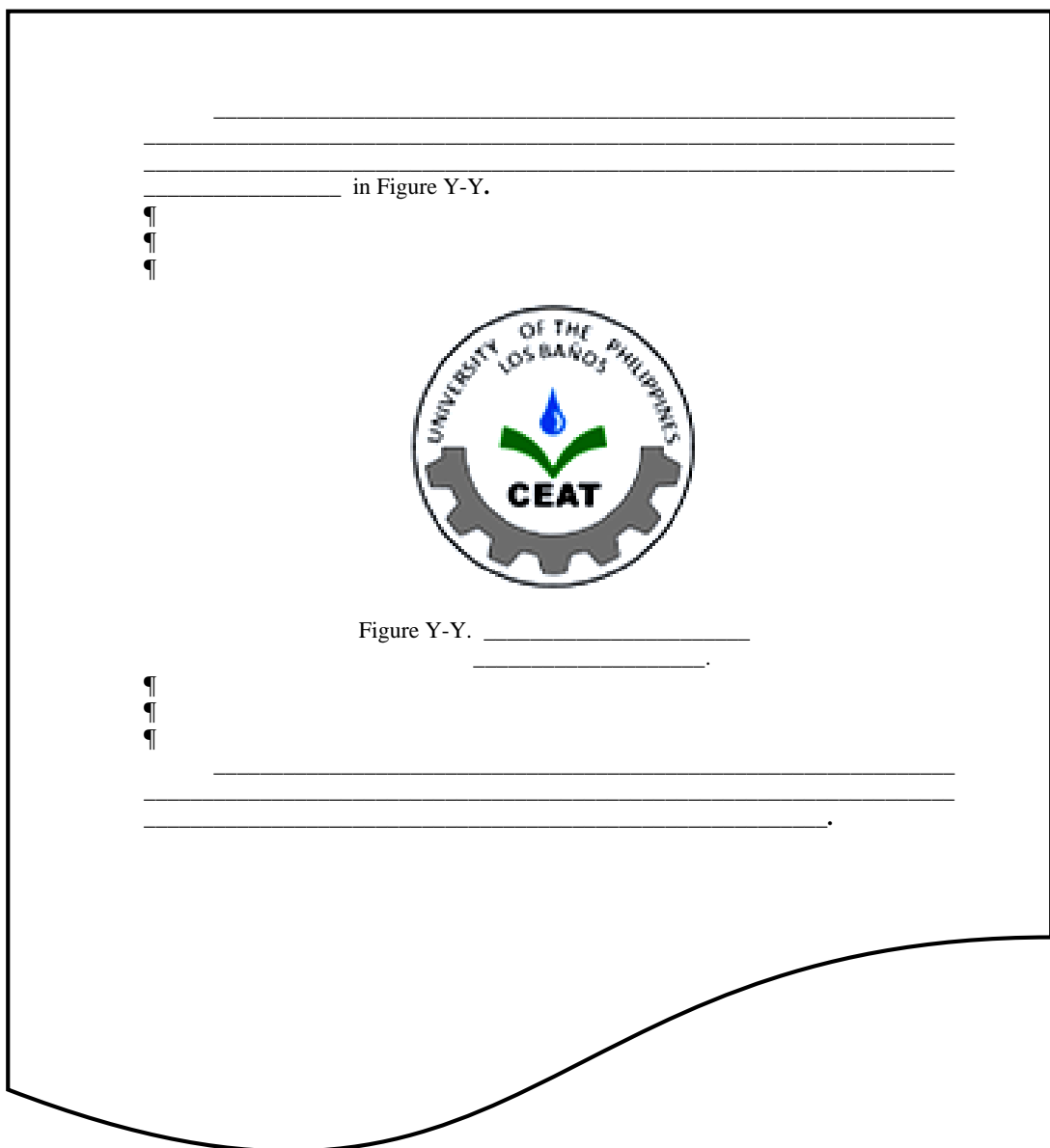
Section 6.4. Figure Presentation in the Text

(a) Figure shall be clear and do not contain unnecessary marks. Preferably, figures other than charts should be printed in colored ink.

(b) Figures can be presented **after** they are mentioned in the text or they could be placed as appendix figures.

(c) Figures shall be positioned at the center of the page. They could be placed along with the text or could be in a separate page. If placed with the text, four (4) spaces shall be maintained between the top edge of the figure and the last line of the preceding text. Likewise, four (4) spaces shall also be provided between the figure caption and the first line of the succeeding text.

(d) Pattern 6.4:



ARTICLE 7 EQUATION PRESENTATION

Section 7.1. Equation Format

(a) Equations between quantities are preferred over equations between numerical values. Equations shall be expressed in their mathematically correct form.

(b) The variables shall be represented by letters or symbols, the meanings of which are explained in connection with the equation.

(c) All the terms in the equations shall be italicized. However, the definition of terms shall be presented in normal format.

(d) As far as possible, symbols having more than one level of subscript or superscript shall be avoided.

(e) Example 7.1:

$Q_{L,max}$ is preferable to $Q_{L_{max}}$

Section 7.2. Definition of Equation Terms

(a) Each term in the equation (whether a constant or a variable) shall be defined after the equation is presented. For variables requiring a specific unit, the unit shall be enclosed in parenthesis and shall be placed at the end of the definition.

(b) The definition of terms shall be introduced by the word “where:” followed by an enumeration of the terms with their corresponding definitions. The word “where” shall be flushed to the left margin of the page and shall be positioned three (3) spaces below the last line of the equation.

(c) The list of terms shall be single-spaced, each term shall be indented five (5) spaces to the right, reckoned from the word “where:”

(d) Example 7.2:

$$L = 2C + \frac{\pi}{2}(D_L + D_S) + \frac{(D_L - D_S)^2}{4C}$$

→

→

where:

L is the belt pitch length for an open drive (inches)

C is the center to center distance (inches)

D_S is the pitch diameter of small pulley (inches)

D_L is the pitch diameter of large pulley (inches)

π is the number 3.1415926. . .

Section 7.3. Equation Number

(a) Equations shall be numbered consistently and continuously, independent of the numbering of tables and the numbering of figures.

(b) Equation numbers are composed of two numbers separated by a dash. The first number corresponds to the number of the chapter where the equation belongs while the second number corresponds to the number of the equation as it appears in the chapter.

(c) The equation number shall be preceded by the label “*Equation Z-Z*” (not “*Eqn. Z-Z*”). The equation number and label shall be italicized and enclosed in parentheses.

(d) The equation number shall be flushed to the right margin of the page, directly opposite the equation it describes.

(e) Example 7.3:

$$T_R = \frac{F d_m}{2} \left(\frac{L + \pi f d_m}{\pi d_m - f L} \right) \quad (\text{Equation 3-11})$$

where:

- T_R is the torque required to lift the axial load
- F is the axial load carried by the screw
- d_m is the screw mean diameter
- f is the coefficient of friction between the nut and the screw
- L is the screw lead
- π is the number 3.1415926. . .

Section 7.4. Equation Presentation in the Text

(a) Equations can be presented **after** they are mentioned in the text or they could be placed in the appendix.

(b) Equations shall be indented ½ inch to the right. If placed with the text, four (4) spaces shall be maintained between the first line of the equation and the last line of the preceding text. Likewise, four (4) spaces shall also be provided between the last defined term of the equation and the first line of the succeeding text

(c) If the equation is too long, it shall be cut off in such a way that it retains its correct form and meaning.

(d) Pattern 7.4:

_____ in Equation Z-Z.

¶
¶
¶

$$X = A + b - C \qquad \text{(Equation Z-Z)}$$

¶
¶

where:

- X is the _____
- A is the _____
- b is the _____
- C is the _____

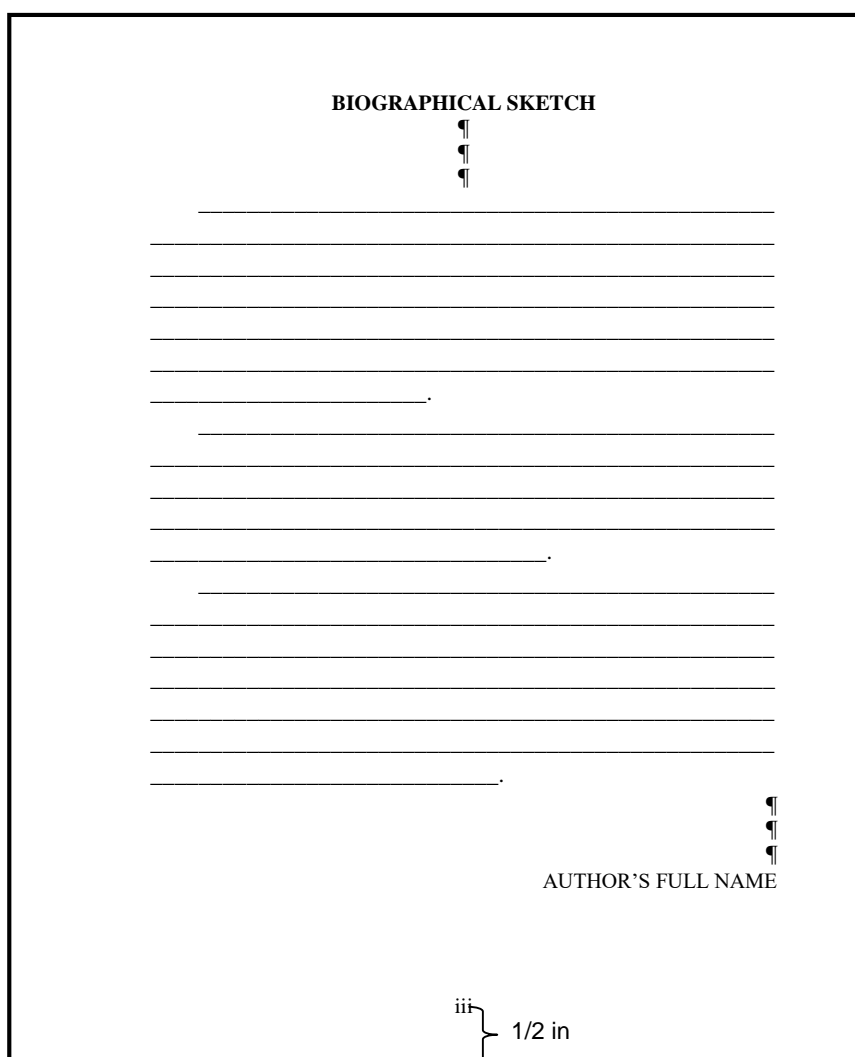
¶
¶
¶

_____.

PAGINATION

Section 8.1. Pagination for Preliminary Pages

- (a) Preliminary pages shall contain lowercase roman numeral page numbers.
- (b) Page numbers shall be positioned at the bottom of each page, center-aligned and placed $\frac{1}{2}$ inch from the bottom edge of the page.
- (c) The TITLE PAGE and the APPROVAL PAGE shall have imaginary page numbers.
- (d) Example 8.1:

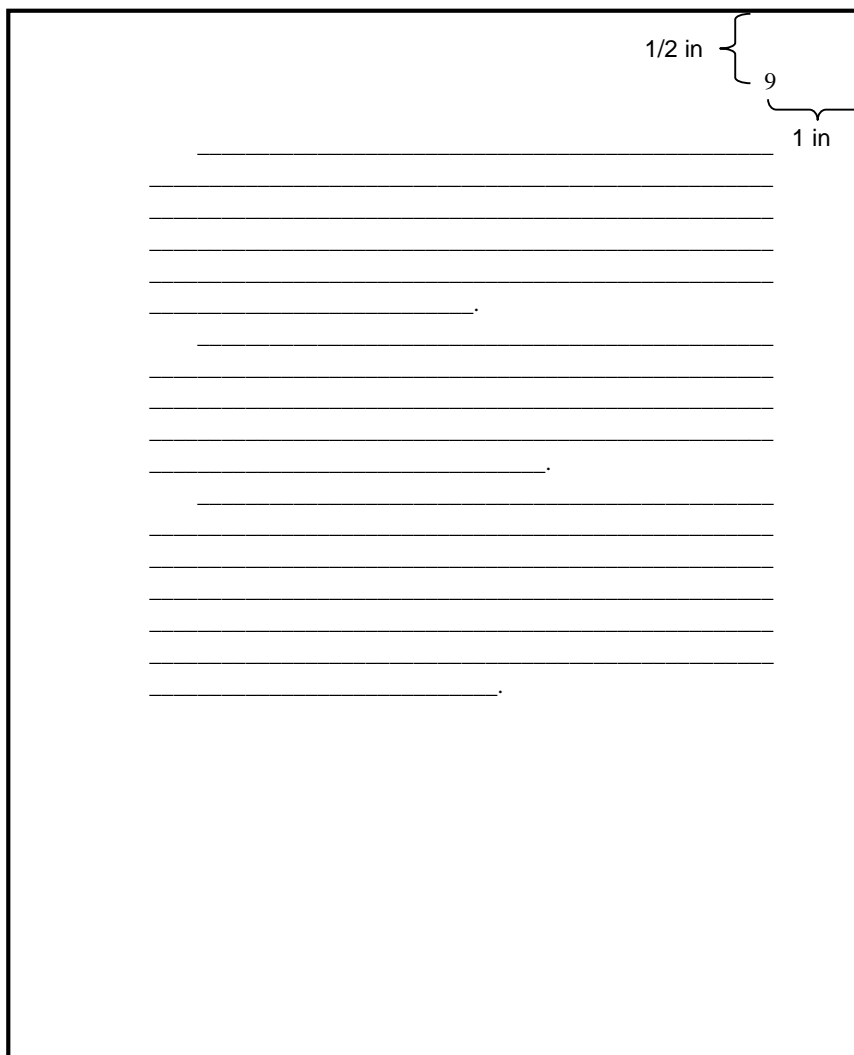


Section 8.2. Pagination for the Main Body

- (a) The main body of the manuscript shall contain arabic numeral page numbers.
- (b) Page numbers shall be positioned at the upper right corner of the page, positioned 1 inch from the right side and $\frac{1}{2}$ inch from the topside.

(c) Pages containing the main headings (INTRODUCTION, REVIEW OF LITERATURE, THEORETICAL BACKGROUND, MATERIALS AND METHODS, RESULTS AND DISCUSSION, SUMMARY AND CONCLUSION, RECOMMENDATIONS, REFERENCES, APPENDICES) shall have imaginary page numbers.

(d) Example 8.2:



Section 9.1. Appendix Format

The items that are included in the appendices, appendix tables and appendix figures shall be formatted according to the guidelines governing the presentation of texts, tables, figures and equations.

Section 9.2. Appendix Letter and Title

(a) Appendices shall be lettered chronologically starting from "APPENDIX A".

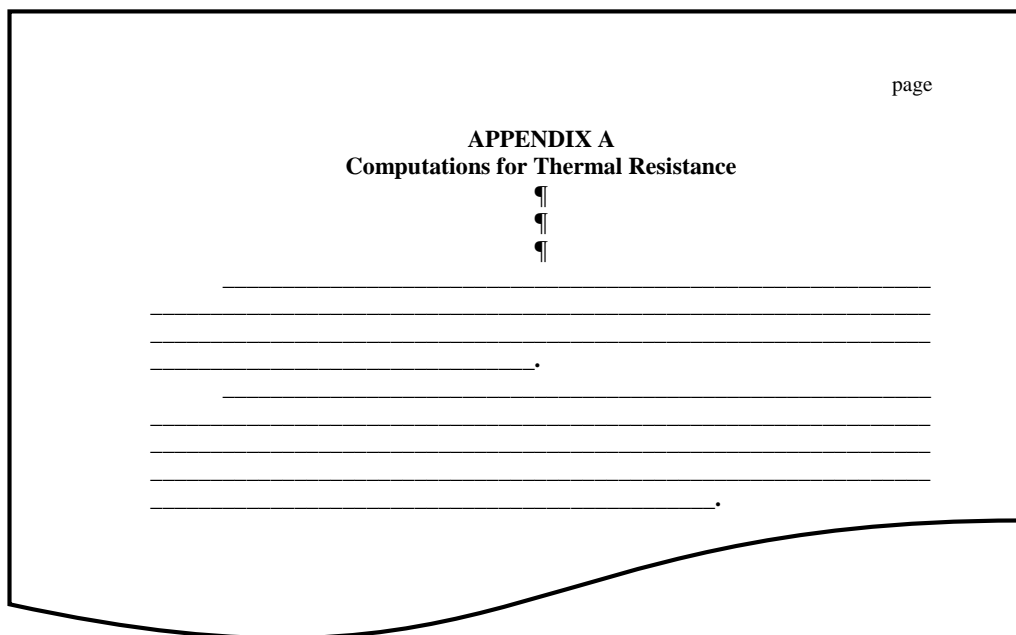
(b) The heading "APPENDIX ___" shall be positioned at the topmost line of the page, center aligned and in uppercase and bold letters.

(c) The appendix title shall be positioned at the center of the page, below the heading "APPENDIX ___", in bold letters, and with the first letter of all significant words capitalized.

(d) If the appendix title is composed of five or more words, it shall be arranged in an inverted pyramid form, in single space.

(e) Four (4) spaces shall be maintained between the last line of the appendix title and the first line of the first paragraph.

(f) Example 9.2:



Section 9.3. Appendix Presentation in the Text

(a) The appendices shall be introduced by a single page labelled “APPENDICES”. This label shall be in uppercase and bold letters, and centered vertically and horizontally in the page. This page shall have an imaginary page number. Similar pages shall be provided for appendix tables and appendix figures.

(b) Example 9.3:



(c) Each appendix shall be started on a new page, regardless of the space left on the previous page.

ARTICLE 10 REFERENCES

Section 10.1. General Format

(a) The bibliographic formats contained in this article were adopted from the American Psychological Association (APA) style of bibliographic citation *with modifications*. Additional formatting guidelines are prescribed in subsequent paragraphs.

(b) Authors' name shall be all in uppercase letters, surname shall be indicated first before the first name and middle initial.

(c) When dealing with more than one author, the ampersand "&" shall be used instead of the word "and".

(d) In books or articles with up to six authors, all the author names shall be written. In cases where there are more than six authors, the first six names shall be written, followed by three periods, an ampersand "&", and then followed by the name of the last author.

(e) Pattern 10.1.1:

AUTHOR, A.A.A., AUTHOR, B.B.B., AUTHOR, C.C.C., AUTHOR, D.D.D.,
AUTHOR, E.E.E., & AUTHOR, F.F.F., . . . & AUTHOR, C.C.C. (Year of
publication). Book title in sentence case (edition if later than the first). Place of
Publication: Publisher.

AUTHOR, A.A.A., AUTHOR, B.B.B., AUTHOR, C.C.C., AUTHOR, D.D.D.,
AUTHOR, E.E.E., AUTHOR, F.F.F., . . . & AUTHOR, Z.Z.Z. (Year of
publication). Book title in sentence case (edition if later than the first). Place of
Publication: Publisher.

(f) Titles of books and articles shall be presented in sentence case (i.e. only the first letter of the first word is capitalized, including any proper noun or acronym).

(g) The edition number (other than the first edition) shall be indicated after the title. It shall be enclosed in parenthesis and should be presented similar to this example: (7th ed.).

(h) The elements of the entry (e.g. author, date, title, location, publisher, etc) shall be followed by a period and a space.

(i) Terms like "Inc.", "Ltd", "Co.", "Company" etc. shall be omitted when presenting the publisher.

(j) For works with no identified authors, the book or article title shall be placed in the author's position. However, such title shall be in sentence case and shall start at the first significant word of the title.

(k) Pattern 10.1.2:

Book title in sentence case. (Year of publication). Place of Publication: Publisher.

(l) For undated references, the abbreviation “n.d.” shall be indicated in the space provided for the publication date. The word “undated” shall not be used.

(m) The entries shall be presented in hanging indent style.

(n) Double spaces shall be maintained between entries but single space should be maintained within entries.

(o) Pattern 10.1.3:

_____.

_____.

(p) Italics (except for non-English terms and scientific names), underscores, and quotations marks shall not be used in the entries.

(q) The reference list shall be arranged alphabetically by author surname or by title when the entry has no author.

(r) For multiple works with the same author, the entries shall be ordered chronologically from the earliest. For multiple works with the same author in the same year, the entries shall be ordered alphabetically by title. In addition, a lower case letter shall be added to the year of publication (e.g. 2010a, 2010b).

(s) All entries shall be included in the reference list. Books, journal articles, web pages, etc shall not be listed in separate sections.

(t) More specific formats for different cases are prescribed in subsequent sections.

Section 10.2. Book by a Single Author

(a) Pattern 10.2:

AUTHOR, A.A.A. (Year of publication). Book title in sentence case, (edition if later than the first). Place of Publication: Publisher.

(b) Example 10.2:

SPARK, C.S. (2002). Contemporary engineering economics (3rd ed.). Jurong, Singapore: Pearson Education South Asia PTE.

Section 10.3. Book by Two or More Authors

(a) Pattern 10.3:

AUTHOR, A.A.A., AUTHOR, B.B.B., . . . & AUTHOR, C.C.C. (Year of publication).
Book title in sentence case (edition if later than the first). Place of Publication:
Publisher.

(b) Example 10.3.1:

GUZELLA, L. & ONDER, C.H. (2010). Introduction to modelling and control of internal
combustion engine systems (2nd ed.). Germany: Springer.

(c) Example 10.3.2:

BREYER, D.E., FRIDLEY, K.J., COBEEN, K.E. & POLLOCK, D.G. (2007). Design of
wood structures ASD/LRFD (6th ed.). New York: Mc-Graw Hill.

Section 10.4. Book by an Organization or Institution

(a) Pattern 10.4:

NAME OF THE INSTITUTION. (Year of publication). Book title in sentence case
(edition if later than the first). Place of Publication: Publisher.

(b) Example 10.4:

FOREST PRODUCTS LABORATORY. (1999). Wood handbook – Wood as an
engineering material. Madison Wisconsin: USDA Forest Service.

Section 10.5. Edited Book

(a) Pattern 10.5:

EDITOR, A.A.A. (Ed.). (Year of publication). Book title in sentence case (edition if later
than the first). Place of Publication: Publisher.

(b) Example 10.5.1:

KUTZ, M. (Ed.). (2007). Handbook of farm, dairy, and food machinery. New York:
William Andrew.

(c) Example 10.5.2:

CHAKRAVERTY, A., MUJUMDAR, A.S., RAGHAVAN, G.S.V. & RAMASWAMY,
H.S. (Eds.). (2003). Handbook of postharvest technology. New York: Marcel
Dekker.

(d) For works with more than one editor, the editors' names shall be presented
according to the patterns described in Section 10.1(e) or Section 10.3 of this article, and
the term "(Ed.)" is changed to "(Eds.)".

Section 10.6. Article or Chapter in an Edited Book

(a) Pattern 10.6:

AUTHOR OF CHAPTER, A.A.A. (Year of publication). Chapter title in sentence case. In A.A.A. Editor/s (Ed/s.), Book title in sentence case (edition if later than the first), (pp. start-end page number of chapter). Place of Publication: Publisher.

(b) Example 10.6:

CURTISS, P.S. (2001). Control fundamentals. In J.F. Kreider (Ed.), Handbook of heating, ventilation and air conditioning, (pp. 339-383). Boca Raton, Florida: CRC Press.

(c) For works with more than one author/editor, the authors'/editors' names shall be presented according to the patterns described in Section 10.1(e) or Section 10.3 of this article, and the term "(Ed.)" is changed to "(Eds.)".

Section 10.7. Several Volumes in a Multivolume Work

(a) Pattern 10.7:

AUTHOR, A.A.A. (Year of publication of 1st vol – year of publication of last volume). Book title in sentence case, (Vols. 1-last). Place of Publication: Publisher.

(b) Example 10.7:

AGRICULTURAL MACHINERY TESTING AND EVALUATION CENTER [AMTEC]. (2000 – 2005). Philippine agricultural engineering standards, (Vols. 1-5). UPLB, College, Laguna: AMTEC.

(c) The "AUTHOR" described by Pattern 10.7 may be the author/s of the volumes, editor/s of the volumes, or the organization responsible in writing the volumes.

(d) For works with more than one author/editor, the authors'/editors' names shall be presented according to the patterns described in Section 10.1(e) or Section 10.3 and Section 10.5(c) of this article.

Section 10.8. Website or Webpage

(a) Pattern 10.8:

AUTHOR, A.A.A. (Year when the site was produced or the document was published). Document title in sentence case. Retrieved Month Day, Year from full internet address

(b) Example 10.8:

DOVEY, M.R. (2010). Solar-powered fluidyne (Fluid piston stirling cycle engine). Retrieved April 4, 2011 from <http://www.iedu.com/DeSoto/Fluidyne/Dyne.html>

(c) The internet address shall not be ended by a period. In addition, the hyperlink associated with such address shall be removed.

(d) The internet address may be cut if too long, in order to comply with the required alignment (justified) of each entry.

Section 10.9. Website of an Organization or Institution

(a) Pattern 10.9:

ORGANIZATION OR INSTITUTION. (Year when the site was produced or the document was published). Document title in sentence case. Retrieved Month Day, Year from full internet address

(b) Example 10.9:

NATIONAL RENEWABLE ENERGY LABORATORY. (2008). Biofuels. Retrieved January 30, 2009 from http://www.nrel.gov/learning/re_biofuels.html

(c) See Section 10.8(c) and Section 10.8(d).

Section 10.10. Electronic Book (E-Book)

(a) For an electronic book (e-book), the guidelines stated in Section 10.2 to Section 10.7 of this article apply, but the phrase “[Electronic version]” is added after the title of the book.

(b) Pattern 10.10:

AUTHOR, A.A.A. (Year of publication). Book title in sentence case (edition if later than the first) [Electronic version]. Place of Publication: Publisher.

(c) Example 10.10:

SOLOMAN, S. (2010). Sensors handbook (2nd ed.) [Electronic version]. New York: McGraw Hill.

Section 10.11. Dictionary or Encyclopedia Article

(a) Pattern 10.11:

AUTHOR, A.A.A. (Year of publication). Title of encyclopedia entry/article in sentence case. In title of encyclopedia (Vol number, pp. start page – end page of the article). Place of Publication: Publisher.

(b) Example 10.11: Dictionary with no identified author

Agriculture. (2004). In Webster's universal english dictionary (p. 9). Scotland: Geddes & Grosset.

Section 10.12. Dictionary or Encyclopedia Article (online)

(a) Pattern 10.12:

AUTHOR, A.A.A. (Year of publication). Title of encyclopedia entry/article in sentence case. In title of encyclopedia. Retrieved Month Day, Year from full internet address

(b) Example 10.12:

SMITH, R.J., (2011). Engineering. In Encyclopedia Britannica. Retrieved April 24, 2011 from <http://www.britannica.com/EBchecked/topic/187549/engineering>

Section 10.13. Journal Article

(a) Pattern 10.13:

AUTHOR, A.A.A. (Year when the article was published). Article title in sentence case. Title of the journal, volume number if available (issue number), inclusive pages.

(b) Example 10.13:

BITOG, J.P.P., ELAURIA, J.C., ELEPAÑO, A.R. & RESURRECCION, A.N. (2009). Design, fabrication and evaluation of a direct-fired corncob furnace for corn drying. *Philippine Journal of Agricultural and Biosystems Engineering*, 7, 3-15.

Section 10.14. Journal Article (electronic with DOI)

(a) DOI stands for Digital Object Identifier, a series of alphanumeric characters assigned and unique to an online article. The DOI is typically found at the first page of the online journal article.

(b) Pattern 10.14:

AUTHOR, A.A.A. (Year when the article was published). Article title in sentence case. Title of the journal, volume number if available (issue number), inclusive pages. doi:

(c) Example 10.14:

GRANT, R.H. (1997). Partitioning of biologically active radiation in plant canopies. *International Journal of Biometeorology*, 40(1), 26-40. doi: 10.1007/BF02439408

Section 10.15. Journal Article (electronic without DOI)

(a) Pattern 10.15:

AUTHOR, A.A.A. (Year when the article was published). Article title in sentence case. Title of the journal, volume number if available (issue number), inclusive pages. Retrieved Month Day, Year from full internet address

(b) Example 10.15:

RAÑOLA, R.F. JR., DEMAFELIS, R.B., DEL ROSARIO, E., & BATALLER, B.G. (2009). Enhancing the viability of cassava feedstock for bioethanol in the Philippines. *ISSAAS Journal*, 15(2), 147-158. Retrieved January 31, 2011 from http://www.issaas.org/journal/v15/02/journal-issaas-v15n2-13-ranola-et_al.pdf

Section 10.16. Magazine Article

(a) Pattern 10.16:

AUTHOR, A.A.A. (Year, Month and day if available). Article title in sentence case. Title of the magazine, volume number if available (issue number), inclusive pages.

(b) Example 10.16:

ELEPAÑO, A.R. & GRATUITO, M.K.B. (2003, October). Renewable energy-based drying systems in the Philippines. *Agriculture*, 7(10), 10-12.

Section 10.17. Newspaper Article

(a) Pattern 10.17:

AUTHOR, A.A.A. (Year, Month and day). Article title in sentence case. Name of the newspaper, p./pp. inclusive pages.

(b) Example 10.17:

GIRON, A. (2011, April 13). Cavite set on building central agri market to rival Divisoria. *Manila Bulletin*, p. 13.

Section 10.18. Magazine or Newspaper Article (electronic)

(a) Pattern 10.18.1:

AUTHOR, A.A.A. (Year, Month and day if available). Article title in sentence case. Title of the magazine, volume number if available (issue number), inclusive pages. Retrieved Month Day, Year from full internet address

(b) Pattern 10.18.2:

AUTHOR, A.A.A. (Year, Month and day). Article title in sentence case. Name of the newspaper, p./pp. inclusive pages. Retrieved Month Day, Year from full internet address

(c) Example 10.18:

GOYAL, S. (2011, April-May). Bioenergy: Impediments and plausible solutions. AltEnergy eMagazine. Retrieved April 25, 2011 from <http://www.altenergymag.com/emagazine/2011/04/bioenergy-impediments-and-plausible-solutions/1701>

Section 10.19. Conference Paper (published proceedings)

(a) Pattern 10.19:

AUTHOR, A.A.A. (Year, Month of publication). Title of paper in sentence case. Paper presented at Title of published proceedings. Place of Publication: Publisher.

(b) Example 10.19:

BADILLA, D.B., GOSTOMSKI, P.A. & DALIDA, M.L.P. (2010, September). Biofiltration for indoor air pollution control. Paper presented at 5th Engineering Research and Development for Technology (ERDT) Conference. Manila: ERDT Consortium.

Section 10.20. Conference Paper (unpublished proceedings)

(a) Pattern 10.20:

AUTHOR, A.A.A. (Year, Month and day of paper presentation). Title of paper in sentence case. Paper presented at Title of conference/ symposium/ meeting/ convention, Location of the conference.

(b) Example 10.20:

ZUBIA, O.F., PARAS, F.O., GALLEGOS, R.K.B., RESURRECCION, A.N., RAFOSALA, B.C. & CATUBIG, J.C.M. (2010, April 22). Pneumatic fertilizer distribution. Paper presented at 60th PSAE Annual National Convention, Benguet State University, La Trinidad, Benguet.

Section 10.21. Thesis, Dissertation or Field Practice Manuscript

(a) Pattern 10.21:

AUTHOR, A.A.A. (Year of thesis submission). Title of thesis in sentence case. Unpublished undergraduate thesis or Unpublished master's thesis or Unpublished doctoral dissertation or Unpublished undergraduate field practice report– Degree. University or Institution, Location of the Institution.

(b) Example 10.21.1:

BADAYOS, N.G. (2003). Single line voltage (10V-15V) fault location through difference surge pattern identification. Unpublished undergraduate thesis – Electrical Engineering. University of the Philippines, Los Baños, College, Laguna.

(c) Example 10.21.2:

MARIANO, L.A. (2007). Productivity improvement at the surface treatment division of Nidec Copal Philippine Corporation, Cabuyao, Laguna. Unpublished undergraduate field practice report – Industrial Engineering. University of the Philippines, Los Baños, College, Laguna.

(d) Example 10.21.3:

AMONGO, R.M.C. (1995). Treatment and disposal of nata de coco wastewater. Unpublished master's thesis - Agricultural Engineering. University of the Philippines Los Baños, College, Laguna.

(e) Example 10.21.4:

ELAURIA, J.C. (1993). Optimization of fluidized bed combustion of Semirara coal. Unpublished doctoral dissertation - Mechanical Engineering. University of the Philippines Diliman, Diliman, Quezon City.

Section 10.22. Technical Reports or Papers

(a) Pattern 10.22:

AUTHOR, A.A.A. (Year of report submission). Title of report in sentence case. Unpublished technical report – course or subject. University or Institution, Location of the Institution.

(b) Example 10.22:

GALLEGOS, R.K.B. (2011). Energy analysis of cassava bioethanol production in the Philippines. Unpublished technical paper – AENG 266. University of the Philippines Los Baños, College, Laguna.

Section 10.23. Brochure

(a) Pattern 10.23:

AUTHOR, A.A.A. (Year). Title of brochure [Brochure]. Place: Use “Author” as publisher.

(b) Example 10.23:

AMD-IAE. (2011). Agricultural machinery division [Brochure]. CEAT, UPLB, College, Laguna: Author.

Section 10.24. Lecture Notes (print and presentation)

(a) Pattern 10.24:

AUTHOR, A.A.A. (Year of publication). Title of lecture in sentence case [Handouts or Powerpoint slides if applicable]. University or Institution, Location of the Institution.

(b) Example 10.24:

SALUDES, R.B. (2010). Solar radiation interaction with plants [Powerpoint slides]. AFSD-IAE, CEAT, UPLB, College, Laguna.

Section 10.25. Lecture Notes (online)

(a) Pattern 10.25:

AUTHOR, A.A.A. (Year of publication). Title of lecture in sentence case. Retrieved Month Day, Year from full internet address

(b) Example 10.25:

VENKATESHAN, S.P. (2010). Introduction to pressure measurement. Retrieved April 16, 2010 from http://nptel.iitm.ac.in/courses/IIT-MADRAS/Mechanical_Measurements_Metrology/index.php

Section 11.1. General Content

(a) In general, paraphrased in-text citations shall contain the author's surname and the year of publication. The page number shall be included when presenting a direct quotation.

(b) More specific formats for different cases are prescribed in the subsequent sections.

Section 11.2. Works with One Author

(a) Example 11.2.1:

. . . its transportation or use (Brown, 2003).

(b) Example 11.2.2:

Ohmura (1982) pointed out . . .

Section 11.3. Works with Two Authors

(a) Example 11.3.1:

Dufie and Beckman (1980) suggested . . .

(b) Example 11.3.2:

Earlier investigations (Ibanez & Perez, 1980) revealed that . . .

Section 11.4. Works with Three or More Authors

(a) For works with three or more authors, only the first author's surname shall appear and shall be followed by the phrase "et al."

(b) Example 11.4.1:

. . . excellent sources of energy in remote areas (Althouse et al., 1996).

(c) Example 11.4.2:

Acra et al. (1990) measured . . .

Section 11.5. Works with No Author

(a) When the work has no author, the first two or three words of the book or article title shall be cited, followed by the year or “n.d.” for undated references.

(b) Example 11.5:

. . . is defined as . . . (Grolier Dictionary, 1992).

Section 11.6. Undated Works

(a) Example 11.6.1:

. . . manufacture of renewable energy systems and components (Elauria, n.d.).

(b) Example 11.6.2:

Sen (n.d.) presented a method . . .

Section 11.7. Multiple Works in the Same Sentence

(a) When the multiple works are cited in the same sentence or paragraph, the author names and dates shall be separated by semicolon.

(b) Example 11.7:

Bowen ratio estimation had been conducted in various locations like lakes, grass canopies, forests and agricultural sites (Rohli, 2004; Ibanez & Perez, 1998; Kakane & Agyei, 2006; Todd et al., 2000).

Section 11.8. Group or Institution as Author

(a) When the institution is commonly known by an acronym, the full name of the institution is written out when presented for the first time in the text. The full name shall be followed by its acronym in square bracket. In subsequent citations, the acronym shall suffice, followed by the year of publication.

(b) Example 11.8.1:

First mention

In the Philippines, duck ranks second to chicken in economic importance as a source of egg and meat (Bureau of Agricultural Statistics [BAS], 2007).

Second mention

The duck population is distributed in different provinces in the country where the top five regional producers include Regions III, VI, II, XII and IV (BAS, 2007).

(c) For institutions not commonly represented by acronyms, the whole name shall be presented followed by the year of publication.

(d) Example 11.8.2:

Lascar Electronics (2010) claimed that . . .

(e) Example 11.8.3:

. . . can be used for different solar applications (Solar Server, 2010).

Section 11.9. Works Discovered in another Work

(a) Example 11.9.1:

Lundy (1969), cited by Espinas (1981), reported that the . . .

(b) Example 11.9.2:

. . . the equation for heat production of an embryo (Schmidt-Nielsen, 1975, cited by French, 1997).

Section 11.10. Personal Communication

(a) Personal communication shall not be included in the reference list and this format shall appear in text only.

(b) Example 11.10.1:

. . . the performance of the multi-crop dryer (E.P. Lozada, personal communication, January 21, 2007).

(b) Example 11.10.2:

M. G. Villano (personal communication, August 5, 2009) explained the possible effects . . .

Section 11.11. Direct Quotations in the Text

(a) The cases and examples contained in the previous sections apply to paraphrased texts. For direct quotations, Sections 1 to 9 still apply but the page number where the quotation was lifted shall be included.

(b) Example 11.11.1:

De la Cruz (2010) found that “ there is no significant difference . . .” (p. 29).

(c) Example 11.11.2:

. . .“the amount of water, on, under or above the earth’s surface . . .” (Leap, 1999, p. 3).

Section 12.1. Adoption of SI Units of Measure

(a) Authors are strongly encouraged to use the SI system of units in their manuscripts, although the English system may still be used in justifiable cases.

(b) All SI units that are used in thesis and field manuscripts shall be presented according to their correct representations stated in subsequent sections.

(c) The guidelines included in this article were adopted from Philippine Agricultural Engineering Standards (PAES) 010:2005 and 020:2005

Section 12.2. SI Base and Supplementary Units and their Symbols

The following table contains the base and supplementary units in SI and their corresponding symbols. Such units shall be used properly in the manuscript.

	Quantity	Unit	Symbol of SI Unit
Base Units:			
1	length	meter	m
2	mass	kilogram	kg
3	time	second	s
4	electric current	ampere	A
5	thermodynamic temperature	kelvin	K
6	amount of substance	mole	mol
7	luminous intensity	candela	cd
Supplementary units:			
1	plane angle	radian	rad
2	solid angle	steradian	sr

Section 12.3. SI Unit Prefixes, Symbols, and their Multiples and Submultiples

The following table contains the prefixes and symbols of units in SI and their corresponding multiples and submultiples. Such prefixes and symbols shall be used properly in the manuscript.

Prefix	SI Symbol	Multiples and Submultiples	Meaning (No. of times multiplied)
exa*	E	10^{18}	1 000 000 000 000 000 000
peta*	P	10^{15}	1 000 000 000 000 000
tera*	T	10^{12}	1 000 000 000 000
giga	G	10^9	1 000 000 000
mega	M	10^6	1 000 000
kilo	k	10^3	1 000
hecto**	h	10^2	100
deca**	da	10^1	10
deci**	d	10^{-1}	0.1
centi	c	10^{-2}	0.01
milli	m	10^{-3}	0.001
micro	μ	10^{-6}	0.000 001
nano*	n	10^{-9}	0.000 000 001
pico*	p	10^{-12}	0.000 000 000 001
femto*	f	10^{-15}	0.000 000 000 000 001
atto*	a	10^{-18}	0.000 000 000 000 000 001

* Rarely used, mostly in highly scientific work

** Not preferred

Section 12.4. Derived Units

Derived units are combinations of basic units or other derived units as needed to describe physical quantities. The following table contains some common derived units in SI and their corresponding formulas. Such units shall be used properly in the manuscript.

Quantity	Unit	SI Symbol	Formula
acceleration	meter per second squared	-	m/s^2
Activity (of a radioactive source)	disintegration per second	-	(disintegration)/s
Angular acceleration	radian per second squared	-	rad/s^2
Angular velocity	radian per second	-	rad/s
Area	square meter	-	m^2
Density	kilogram per cubic meter	-	kg/m^3
electrical capacitance	farad	F	$\text{A}\cdot\text{s}/\text{V}$
electrical conductance	siemens	S	A/V
electrical field strength	volt per meter	-	V/m
electrical inductance	henry	H	$\text{V}\cdot\text{s}/\text{A}$
electrical potential difference	volt	V	W/A
electrical resistance	ohm	Ω	V/A

electromotive force	volt	V	W/A
energy	joule	J	N·m
Entropy	joule per kelvin	-	J/K
Force	newton	N	kg·m/s ²
frequency	hertz	Hz	(cycle)/s
illuminance	lux	lx	lm/m ²
luminance	candela per square meter	-	cd/m ²
luminous flux	lumen	lm	cd·sr
magnetic field strength	ampere per meter	-	A/m
magnetic flux	weber	Wb	V·s
magnetic flux density	tesla	T	Wb/m ²
magnetomotive force	ampere	A	-
Power	watt	W	J/s
Pressure	pascal	Pa	N/m ²
quantity of electricity	coulomb	C	A·s
quantity of heat	joule	J	N·m
radiant intensity	watt per steradian	-	W/sr
specific heat	joule per kilogram-kelvin	-	J/kg·K
Stress	pascal	Pa	N/m ²
thermal conductivity	watt per meter-kelvin	-	W/m·K
Velocity	meter per second	-	m/s
viscosity, dynamic	pascal-second	-	Pa·s
viscosity, kinematic	square meter per second	-	m ² /s
voltage	volt	V	W/A
volume	cubic meter	-	m ³
wavenumber	reciprocal meter	-	(wave)/m
Work	joule	J	N·m

Section 12.5. Application of Prefixes

(a) The prefixes shall be used to indicate orders of magnitude, thus eliminating insignificant digits and decimals, and providing a convenient substitute for writing powers of 10 as generally preferred in computation.

(b) Example 12.5.1:

12 300 m	OR	12.3 x 10 ³ m	BECOMES	12.3 km
15 100 g	OR	15.1 x 10 ³ g	BECOMES	15.1 kg
0.020 L	OR	20.0 x 10 ⁻³ L	BECOMES	20 mL
0.0123 mA	OR	12.3 x 10 ⁻⁶ A	BECOMES	12.3 μA

(c) The prefix is not separated but combined with the parent unit (root word) to form one word.

(d) Example 12.5.2:

centimeter	NOT	centi meter	NOR	centi-meter
kilogram	NOT	kilo gram	NOR	kilo-gram
milliliter	NOT	milli liter	NOR	milli-liter

(e) Not more than one prefix shall be included in any unit. Double prefixes and hyphenated prefixes shall not be used.

(f) Example 12.5.3:

nanometer (nm)	NOT	millimicrometer (m μ m)
millimeter per second (mm/s)	NOT	millimeter per microsecond (mm/ μ s)

(g) When a unit is expressed in the form of a product or quotient, the prefixed unit, if any, should be the first occurring unit.

(h) Example 12.5.4:

millinewton meter (mN·m)	NOT	Newton millimeter (N·mm)
millimeter per second (mm/s)	NOT	meter per millisecond (m/ms)

(i) The only base unit that contains a prefix is the kilogram. Multiples and submultiples of a derived unit containing kilogram are formed by addition of prefixes to the term "gram". If kilogram is not the first term, then two prefixes may appear in the derived units.

(j) Example 12.5.5:

kg/m ³	AND HENCE	g/m ³	AND	mg/m ³
J/kg	AND HENCE	kJ/kg	AND	MJ/kg

(k) As much as possible, prefixes shall not be used in the denominator except for kilogram which is a base unit.

(l) Example 12.5.6:

Correct Symbol	Not Correct
50 000 J/s	50 J/ms
25 000 m/s	25 N/ms

(m) With SI units of higher order such as m² or m³, the prefix is also raised to the same order.

(n) Example 12.5.7:

	Correct Symbols
square millimeter	<ul style="list-style-type: none"> ▪ mm^2 ▪ $(10^{-3} \text{ m})^2$ ▪ 10^{-6} m^2
cubic milliliter	<ul style="list-style-type: none"> ▪ mL^3 ▪ $(10^{-3} \text{ L})^3$ ▪ 10^{-9} m^3

Section 12.6. Selection of Appropriate Units and Prefixes

(a) When expressing a quantity by a numerical value and a unit, a prefix should be chosen so that the numerical value preferably lies between 0.1 and 1000, except where certain multiples and submultiples have been agreed for particular use. The same unit, multiple or submultiple should be used in tables even though the series may exceed the preferred range of 0.1 to 1000.

(b) Example 12.6:

Correct Symbols	Incorrect Symbols
8.613 m	0.008 613 km
861.3 km	861 300.0 m
500 kPa or 0.5 MPa	500 000 Pa

Section 12.7. Capitalization

(a) All unit symbols are written in lower case (small) letters except for SI units derived from a proper name. The following table summarizes the symbols for units derived from proper names.

Units derived from proper name	Symbols
watt	W
volt	V
newton	N
pascal	Pa
coulomb	C
farad	F
siemens	S
weber	Wb
tesla	T
henry	H
becquerel	Bq
degree Celsius	°C
joule	J
hertz	Hz
ampere	A

(b) The “liter” symbol shall be capitalized (L) to avoid confusion with other symbols or numbers like “figure 1”.

(c) Unabbreviated units are not capitalized; for example kelvin, joule, newton, etc. except for Celsius which is always written with a capital C.

(d) Numerical prefixes and their symbols are not capitalized; except for the symbols M (mega), G (giga), T (tera), P (peta) and E (exa).

Section 12.8. Singular and Plural Form

(a) Unabbreviated SI units form their plurals in the usual manner by adding s at the end of the word. Exceptions are “siemens”, “hertz” and “lux” which stand for both singular and plural form. SI symbols are always written in singular form.

(b) Example 12.8:

	Correct Symbol	Not Correct
50 newtons	50 N	50 Ns
25 millimeters	25 mm	25 mms
4 grams	4 g	4 gs
15 kilometers	15 km	15 kms

Section 12.9. Punctuation

(a) A symbol is not an abbreviation of the name of the unit or quantity; therefore periods shall not be used after any SI unit symbol, unless the symbol occurs at the end of a sentence.

(b) Example 12.9.1:

3 kg	not	3 kg.
m ²	not	m. ²

(c) No abbreviation shall be used in SI.

(d) Example 12.9.2:

For Unit:	Use this Symbol	Not the Abbreviation
cubic meter	m ³	cu.m ; cu m
gram	g	gm. ; gm
minute	min	min.

(e) When symbols are used in an adjectival sense, a hyphen may or may not be used between the symbol and the number.

(f) Example 12.9.3:

	Correct (hyphen may/ may not be used)	Not Correct
16 mm film	16-mm film	16 mm-film
3 tonne truck	3 tonne truck	3 tonne-truck

Section 12.10. Spacing

(a) Unit names and symbols are separated from the numerical value by a space, except in the case of degree ($^{\circ}$), minute ($'$) and second ($''$); e.g. 37°C and $28^{\circ}50'24''$.

(b) Example 12.10.1:

21 km	NOT	21km
15 kg	NOT	15kg

(c) A space shall be provided between the numbers and signs for multiplications, division, addition and subtraction.

(d) Example 12.10.2:

4 m x 3 m	NOT	4 mx 3m
6 mm – 3 mm	NOT	6 mm –3 mm
5 cm + 4 cm	NOT	5 cm +4 mm

Section 12.11. Spelling

(a) Since SI is the international language of measurement, it is advisable to adhere as closely and promptly as possible to the SI rules of usage for better word understanding.

(b) The following international spellings of SI units are much preferred: “metre”, “tonne” and “litre” but “meter”, “ton” and liter are permissible.

(c) When referring to the instrument or device and for the verb form, the spelling “meter” is to be used as in “speedometer”, “electric meter”, “taxi meter” and “metered”.

Section 12.12. Derived Units

(a) The product of two or more units in symbolic form is preferably indicated by a dot midway in relation to unit symbol height. The dot may be dispensed with when there is no risk of confusion with another unit symbol.

(b) Example 12.12.1:

100 N·m	OR	100 Nm	NOT	100 mN
1 V·s	OR	1 V s	NOT	1 sV
100 kW·h	OR	100 kWh	NOT	100 hkW

(c) A solidus (oblique stroke, /), a horizontal line or negative powers may be used to express a derived unit formed from two others by division.

(d) Example 12.12.2:

	Correct
15 meters per second	15 m/s 15 $\frac{\text{m}}{\text{s}}$ 15 m·s ⁻¹
35 newtons per square meter	35 N/m ² 35 $\frac{\text{N}}{\text{m}^2}$ 35 N·m ⁻²

(e) Names and symbols are not to be mixed within the same unit expression. For consistency, wither all words in the metric name or description, or all symbols should be used.

(f) Example 12.12.3:

Correct	Incorrect
9 meters per second	9 m per s
9 m/s	9 m per second
	9 meter per s
	9 meter/second
10 joules per second	10 J per s
10 J/s	10 J per second
	10 joules per s
	10 joules/second

Section 12.13. Use of Decimals

(a) Whenever a numerical value is less than one, a zero shall precede the decimal point.

(b) Example 12.13.1:

Correct	Incorrect
0.7 mL	.7 mL
0.1 kg	.1 kg

(c) Decimals should be used as much as possible instead of common fractions, which should be avoided. Decimals are also preferred for computer applications as common fractions introduce complications in key punching and programming.

(d) Example 12.13.2:

Correct	Not Preferred
0.75 L	$\frac{3}{4}$ L
1.5 m	1 $\frac{1}{2}$ m

Section 12.14. Grouping of Numbers

(a) In SI, to facilitate reading, numbers which have four or more digits shall be arranged in groups of three, separated by a space instead of comma, counting from the decimal position or marker with a space or gap between groups. This is to avoid confusion since some European countries use the comma as decimal marker.

(b) Example 12.14.1:

Correct	Incorrect
983 769.816 34	986 769.81634
1 532	1,532

(c) In the Philippines, the use of comma as thousand separator or marker is allowed.

(d) Example 12.14.2:

Correct:
9,494 m
10,666.25 L

Section 12.15. Non-SI Units

(a) Certain units outside the SI are recognized by ISO because of their practical importance in specialized fields. Recognized names for some multiples of units such as "liter" (L) for volume, "hectare" (ha) for land measure and "metric ton" (t) for mass.

(b) The SI base unit for thermodynamic temperature is kelvin (K). Because of the wide usage of the degree Celsius, particularly in engineering and nonscientific areas, the Celsius scale (formerly called the centigrade scale) may be used when expressing temperature.

(c) The SI unit for time is the second. This unit is preferred and should be used when technical calculations are involved. In other cases use of the minute (min), hour (h), day (d), etc., is permissible.

(d) The SI unit for plane angle is the radian. The use of arc degrees ($^{\circ}$) and its decimal or minute ($'$), second ($''$) submultiple is permissible when the radian is not a convenient unit. Solid angles should be expressed in steradians.

Section 12.16. Preferred Units and Conversion Factors

Preferred units for expressing physical quantities are presented as an aid in selecting proper units for given applications and to promote consistency where interpretation of the general rules of SI may not produce consistent results. For the preferred units and conversion factors, PAES 020:2005 (Metrication Guidelines) should be consulted.

Section 12.17. Representation of Numbers and Numerical Values

(a) For clarity, the symbol x rather than a point shall be used to indicate multiplication of numbers and numerical values.

(b) Example 12.17.1:

Write 1.8×10^{-3} (not $1.8 . 10^{-3}$ or $1.8 \cdot 10^{-3}$)

(c) To express numbers of items (as opposed to numerical values of physical quantities), the numerals one to nine shall as a general rule be spelt out in full.

(d) Example 12.17.2:

“Carry out the test on five tubes, each 5 m long.”

(e) Example 12.17.3:

“Select further 15 tubes, each 5 m long.”

Section 12.18. Indication of Dimensions and Tolerances

(a) Dimensions and tolerances shall be indicated in an unambiguous manner.

(b) Example 12.18.1:

80 mm x 25 mm x 50 mm (not 80 x 25 x 50 mm)

(c) Example 12.18.2:

80 μ F \pm 2 μ F or (80 \pm 2) μ F

(d) Example 12.18.3:

10 kPA to 12 kPA (not 10 to 12 kPa)

(e) Example 12.18.4:

0 °C to 10 °C (not 0 to 10 °C)

(f) In order to avoid misunderstanding, tolerances on percentages shall be expressed in a mathematically correct form.

(g) Example 12.18.5:

Write “from 63 % to 67 %” to express a range.

(h) Example 12.18.6:

Write “(65 ± 2) %” to express a center value with tolerance. The form “65 ± 2 %” shall not be used.

Section 12.19. Presentation of Quantities, Units and Dimensions

(a) Internationally standardized unit symbols shall not be modified by adding subscripts or other information.

(b) Example 12.19

“ $U_{\max} = 500 \text{ V}$ ” and **not** “ $U = 500 \text{ V}_{\max}$ ”

“a mass fraction of 5 % and **not** “5 % (m/m)”

“a volume fraction of 7 %” and **not** “7 % (V/V)”

(Remember that % = 0.01 and ‰ = 0.001 are “pure” numbers.)

(c) Do not mix information with unit symbols, Write, for example, “the water content is 20 mL/kg” and **not** “20 mL H₂O/kg” or “20 mL of water/kg”.

(d) Quotient quantities shall not contain the word “unit” in the denominator. For example, write “mass per length” and **not** “mass per unit length”.

(e) Distinguish between an object and any quantity describing the object, e.g. between “surface” and “area”, “body” and “mass”, “resistor” and “resistance”, “coil” and “inductance”.

(f) Two or more physical quantities cannot be added or subtracted unless they belong to the same category of mutually comparable quantities. Accordingly, the method of expression for a relative tolerance such as 230 V ± 5 % does not comply with this basic law of algebra. The following methods of expression may be employed instead:

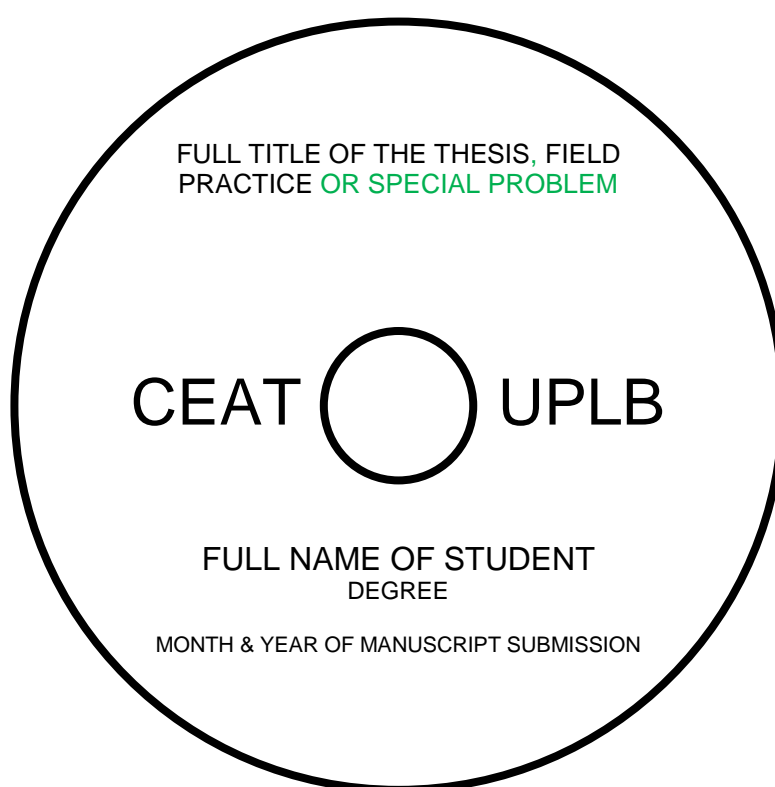
“230 x (1 ± 5 %) V”

“230 x (1 ± 0.05) V”

“230 V, with a relative tolerance of ± 5 %”

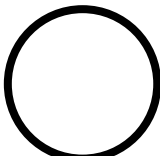
Aside from the bound copies of thesis and field practice manuscripts, divisions, departments and libraries may require the submission of such manuscripts in electronic forms. Submissions may include, but not limited to, Word and pdf copies of the manuscripts, posters, spread sheet entries of data, etc. In such case, submissions should be contained in compact discs (CD) or equivalent. Preferably, CD copies should be labelled according to the following pattern and example:

Pattern 13



Example 13

GRADING OF MILLED RICE (*Oryza sativa*)
USING MACHINE VISION

CEAT  UPLB

PAOLO ROMMEL PAGARIGAN SANCHEZ
BS AGRICULTURAL ENGINEERING

APRIL 2007

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