INSTRUCTIONS ON FORMAT OF FINAL YEAR RESEARCH THESIS

**1. OVERALL FORMAT**

###### **General**

A final year research thesis should make some contributions to knowledge and not be mere collation of existing material. The thesis should be written in English.

**Word Limit**

The length for the thesis (including footnotes, appendices, bibliography, charts, statistical tables, graphs, illustrations, maps etc.) should be between 40-60 pages.

The following guidelines indicate ESP’s general requirements in the preparation of a thesis. The emphasis here is on documentation style that is acceptable in terms of print quality, margin, spacing, page numbering, tables, equations, and other illustrative materials. Certain degree of freedom is thus left to the individual student to allow him/her to find the best possible way to present the actual subject matter on hand.

In what follows, statements typed in normal print signify the requirements that must be compiled with. Sentences in italics are merely some additional suggestions or recommendations for a good thesis presentation.

**Paper and margin**

The thesis should be written in English, submitted on white A4 size paper and printed on both sides of the paper. The left-hand margin should be 37mm to allow for binding. Margins on the remaining three sides should be 25mm each. The text area (i.e., the space covered with type) would then be approximately 148 x 247mm. *Justified right margins are preferred in the text; however ragged right margins are also acceptable.*

The text should have a font size of 12 points (font is the height in points, with 28 points = 1 cm). The entire thesis (with the possible exception of figures and appendices) should be in the same typeface. Do not choose a typeface that is difficult to read. Times Roman is preferred.

The text should be 1.5 lines-spaced throughout with the following exceptions:

* Captions for Figures/Tables – should be single-spaced
* List of Figures/Tables – should be single-spaced and double-spaced between entries
* Footnotes – should be single-spaced

**Print quality**

Clear, clean and sharp copies are required. In the case of photocopies, no fading, extraneous marks or grey background should appear.

**Heading**

The chapter titles, headings, and sub-headings may be of appropriately larger font sizes; 14- and 16-point types are acceptable. *The lowest grade of heading may be run on at the beginning of a paragraph instead of occupying a separate line; it should then be followed by a full stop. Headings on separate line should never have a full stop at the end. Avoid italics in all headings.*

**2. ORGANIZATION**

The thesis may be arranged in the following order:

Title page

Acknowledgement

Table of contents

Summary

Nomenclature

List of Figures

List of Tables

Body of the Thesis

References

Appendices

**Title page, spine and cover**

Title

If the thesis title differs significantly from the original project title, the student should seek approval from the Supervisor, at least one month before the thesis is submitted for examination.

Cover, Spine & Title Page

The cover and spine should carry only the following information in BLOCK LETTERS not exceeding 16 points:

*Cover* *Title Page*

**MODELING AND SIMULATIONS OF**

**CARBON NANOTUBES**

**WANG CHIEN MING**

**A THESIS SUBMITTED**

**FOR THE DEGREE OF BACHELOR OF ENGINEERING**

**ENGINEERING SCIENCE PROGRAMME**

**NATIONAL UNIVERSITY OF SINGAPORE**

* Thesis Title
* Candidate’s

Name

* University

Name

* The words “A

Thesis

Submitted for

the Degree of

\_\_\_\_\_\_”

- Department

**MODELLING AND SIMULATIONS OF**

**CARBON NANOTUBES**

**WANG CHIEN MING**

**ENGINEERING SCIENCE PROGRAMME**

**NATIONAL UNIVERSITY OF SINGAPORE**

**2009/2010**

* Thesis Title
* Candidate’s Name
* University Name
* Year of first

submission

*Spine*

**MODELLING AND SIMULATIONS OF**

**CARBON NANOTUBES**

**WANG CHIEN MING 2009/2010**

* Thesis Title (or an abbreviation thereof)
* Candidate’s Name
* Year of first submission

**Summary**

Each thesis must include a 4-page summary journal paper that is suitable for publication (refer to same format as interim report).

**Body of the Thesis**

The thesis body should be suitably divided into chapters. *Typically, this may consist of Introduction, Background on previous work, Theoretical development, Materials and methods, Results, Discussion and Conclusions.*

**Written English**

In technical writing, clarity is of utmost importance. Every aspect of the thesis, e.g., background work, methods used, discussion of results etc., should be described clearly, concisely and to the point. *Thesis should be no longer than necessary. As preparation of a thesis requires careful attention to grammar, spelling and punctuation, it may be advisable to consult a grammar book/dictionary or seek the assistance of someone with writing skills. Use relevant computer software for checking the spelling, wherever appropriate.*

**3. NUMERATION**

**Pages**

All pages except the Title Page should be paginated. The page numbers should appear in either the lower or upper right-hand corner. The position of the page numbers does not change even on pages with landscape mode (sideways) illustrations. Numbering should be consecutive; errors of omission or duplication are not permissible.

*Preliminary pages* (introductory sections starting from Acknowledgement to Summary) may be numbered with small Roman numerals, beginning with i. Note that the Title Page is not counted.

*Body of the Thesis* starts from the first page of Chapter 1 and is numbered in Arabic numerals (beginning with 1) sequentially through the last page of the thesis, including the Reference List and Appendices.

**Chapters**

Consecutive numbering should be used for chapters of the thesis (e.g., 1,2,3, ...etc.). Chapter 1 is usually the Introduction.

**Sections/sub-sections**

For sections within a chapter the style is as follows: 1.1 denotes the first main section, 1.1.1 denotes the first sub-section of section 1.1, and so on. *Four numbers separated by periods (1.1.1.1) is the maximum useful subdivision; beyond this point further subdivisions result in unsightly indentations. The remedy is to reorganise the material.*

**Appendices**

Use consecutive letters (e.g., Appendix A, B, ...) and a heading to identify each appendix. Sections and sub-sections within an appendix are numbered as, for example, A.1, A.1.1 etc.

**Equations**

All equations are to be numbered consecutively in each chapter. Example: (2.5) refers to the fifth equation in Chapter 2, (A.3) refers to the third equations in Appendix A, and so on. The numeration should appear, within parentheses, flush with the right-hand margin.

**Illustrations**

Illustrations (diagrams, line drawings, graphs, and photographs) should be numbered in the order in which reference is made to them in each Chapter/Appendix in the text, and in separate series without distinction between diagrams, line drawings etc. Example: Figure 3.2 refers to the second illustration in Chapter 3.

**Tables**

The style is the same as for the illustrations.

**4. NOTATION**

Symbols, special nomenclature and abbreviations used should be those generally recommended as standard in the relevant field of engineering. Symbols not available on the typewriter/word-processor should be carefully inserted. All symbols and nomenclature (inclusive of those in Tables, Figures and Appendices) should be separately listed in alphabetical/numerical order.

**5. UNITS**

All units should comply with International System of Units (SI).

**6. EQUATIONS**

Mathematical equations and formulae should not be indented. They should be placed either flush left or centred (follow one system). *They should be preceded and followed by two single line spaces.*

Equations should make appropriate use of parentheses, brackets, exponents etc. *Use a smaller typeface to produce subscripts, superscripts etc., wherever appropriate.*

Example: For even values of *t*, Eqs. (2.2) to (2.4) imply that

(2.5)

**7. TABLES**

The layout of tables should be consistent throughout. Each table should have a caption which makes the general meaning understandable without reference to the text. Only standard abbreviations should be used in the headings of the columns and units should be indicated one line immediately below the headings. *All numbers should be aligned on the decimal point. A uniform degree of accuracy (i.e., the same significant number) should be maintained throughout each column.*

The number and the caption of the table should be typed centrally above the table. Footnotes may be identified by letters, numerals or marks. Horizontal lines are placed above and below table headings, above subheadings and above footnotes. *Vertical lines should be avoided, unless their exclusion leads to ambiguity or confusion.*

Example:

Table 2.3 Sample table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Maximum | Maximum |  | Activity | |
| Model  Number | Assay  (wt %235U) | Net Weight  (kg UF6) | Curie(s)\* | | Curie(s)+ |
| 1S | 100.0 | 1.00000 | 0.04 | | 0.03 |
| 2S | 100.0 | 4.90000 | 0.18 | | 0.17 |
| 5A | 100.0 | 55.0000 | 2.02 | | 1.90 |
| 8A | 12.5 | 255.000 | 0.71 | | 0.65 |
| 12A&B | 5.0 | 460.000 | 0.50 | | 0.45 |
| 30A | 5.0# | 4950.00 | 5.40 | | 4.85 |
| 48A&X | 4.5# | 21030.0 | 20.80 | | 18.70 |
|  |  |  |  | |  |

\*Activities shown are for irradiated uranium. 0.110 parts232U plus 500 parts233U per 106 parts235U are considered to be present.

+Activities shown are for unirradiated uranium.

#Moderation control equivalent to 99.5% pure UF6 is required.

**8. ILLUSTRATIONS, PHOTOGRAPHS AND OTHER ATTACHMENTS**

Wherever possible, illustrations (diagrams, line drawings, graphs and photographs) should be placed in the text as close as possible to the points in the text where they are first mentioned. The number and the caption should be typed centrally at the bottom of the illustration. *As far as possible size of the illustration, including a descriptive caption, should not exceed the text area.*

*Line drawings* should either be in laser printer output or in India ink on white paper, with all lettering, symbols and legends included. *Lettering should be sufficiently large (2 to 4mm height). Recommended line widths are:*

1. *grid lines and scale graduations - 0.15 to 0.3 mm*
2. *borders and arrows - 0.3 to 0.5 mm*
3. *graph lines (plotted curves) - 0.6 to 0.7 mm*

*Point symbols should be used only for experimental data and not for computed results*

Photographic and other illustrations should be securely fixed, preferably by dry-mounting. Photograph album pockets or slits in the page are not adequate. In no circumstances should ‘sellotape’ or a similar material be used for any purpose in a copy of the thesis.

Subsidiary papers and other loose material should be bound in wherever possible. If this is not possible, an adequately guarded pocket for each material should be provided at the end of the thesis. Any such loose material (and corrigenda sheets, if not bound in) should bear the student’s name, initials and degree.

**9. REFERENCES**

Of the many reference systems in use, the name/year system or the sequential numeric system is recommended. In either case, for the purpose of clarity, only standard abbreviations should be used.

**Name/Year system**

Citations are to be made using the last name of the author followed by the year of publication (both authors when only two; first author plus et al. when more than two).

Example: ...as previously shown (Jones et al., 1991) or, ... as shown by Jones et al. (1991)

For two or more papers published by the same author(s) in the same year, letter a, b, c etc. should be added to the year, e.g. (1990a), (1990b). The references should be arranged in *alphabetical* order by authors’ names, and thereafter chronologically by the authors’ name combinations.

**Sequential numbering system**

In this system the references are numbered in the order in which they are cited in the text. The numbers are placed between square brackets on the line, e.g., ... as shown by Jones et al., [4], and collected in *numerical* sequence in the list of references. This system could lead to errors and should be used carefully if additions and deletions are subsequently carried out.

**Examples of complete references**

|  |  |
| --- | --- |
| (i)  (ii)  (iii)  (iv)  (v)  (vi)  (vii) | Journal articles:  Clarke, D.W. and P. Gawthrop. The Self-Tuning Controller, *Proc. IEE*, 199*,* pp. 929-934, 1975.  Books:  Lee, E.S. *Quasilinearization and Invariant Imbedding*. pp. 274-304, New York: Academic Press. 1968.  Edited Books:  Miele, A. (ed). *Theory of Optimum Aerodynamic Shapes*. pp. 75-86, New York: Academic Press. 1965.  Articles in edited books:  Ralston, A. Numerical Integration Methods for the Solution of Ordinary Differential Equations. In *Mathematical Methods for Digital Computers*, Vol.1, ed by A. Ralston and H.S. Wilf, pp. 100-105. New York: John Wiley & Sons. 1965.  Articles in Conference Proceedings:  Chenowerth, D.C. and M.J. Cassaro. Expert System for the Development of ATE Software. In *Proc. 20th Southeastern Symposium on System Theory*, March 1988, Charlotte, USA, pp. 505-508.  Reports:  Huang, H.Y. and A.V. Levy. Numerical Experiments on Quadratically Convergent Algorithms for Function Minimization. *Aero-Astronautics Report No. 66*, Rice University. 1969.  MS/Ph.D Thesis:  Connell, J. A Colony Architecture for an Artificial Creature. *Ph.D Thesis*, Massachusetts Institute of Technology. 1989. |

**10. SUBMISSION OF THESIS**

**Type of Cover/Binding**

Thesis may be bound using spiral or ringback binding. The information as set out above should be printed on the cover.

**Number of Copies**

The number of copies to be submitted/re-submitted is as follows:

* 1 soft copy for ESP office (uploaded via CANVAS platform)
* 1 soft copy to supervisor(s)

## **Deadline for Submission**

The thesis must be submitted to ESP Office before the final oral examination. The exact deadline is stipulated shown in CANVAS.

**CHECKLIST FOR STUDENTS**

1. **Contents**

The manuscript includes

* Title page
* Table of contents
* Summary
* Nomenclature
* List of Illustrations
* Complete text, checked for accuracy
* Tables / Figures
* Original photographs (if applicable)

**2. Style and Conformance to Guidelines**

* Numbering system for pages, chapters, sections and subsections conform

to requirements

* Standard Abbreviations employed
* Standard Symbol employed
* Tables/Figures conform to guidelines
* Tables/Figures are numbered in sequence and cited in text
* Equations conform to guidelines and numbered in sequence
* Standard units of measure employed
* Reference are complete and up-to-date

**3. Final Thesis**

* The manuscript is laser-printed/typewritten, 1.5 lines-spaced, printed on both sides of the paper and of high quality
* Spell-checked employed
* Corrections to the thesis, as suggested by the examiner and supervisor(s), have been thoroughly carried out