CHAPTER 1

1. PREAMBLE

1.1 GENERAL INFORMATION

The purpose of these guidelines is to ensure that every Systems Design courses’ project report which is to carry the name of Industrial Engineering Department of Çankaya University meets the same high standards of presentation. All project groups are supposed to consider the following explanations in their reports. For all cases not covered by the guidelines given in this manual, please obtain the written approval of the System Design Coordinator of the Department of Industrial Engineering concerned before presenting the report.

1.2 REFERENCING THE PREVIOUS WORK OF OTHERS AND PLAGIARISM

Referencing is a matter of honesty and crediting others for their previous ideas and work; but it is also a matter of credibility of your work, in other words, an evidence of the fact that you are aware of what was done on the topic you have been dealing with in your project.

Using ideas and research findings of others, and yet pretending that they are your own is plagiarism, which is not only unethical and immoral but also a crime. Therefore, great care must be given to using a proper style in writing your manuscript so that your original work and work of others are clearly distinguishable without any ambiguity, and that all ideas and work of others used in your study are meticulously referenced.
CHAPTER 2

2. FORMAT AND APPEARANCE

2.1 CONTEXT

The report should be laid out in the following format:

- Title Page
- Statement of Nonplagiarism Page
- Abstract
- Özet
- Acknowledgement
- Table of Contents
- List of Tables
- List of Figures
- List of Symbols and/or Abbreviations
- List of Appendices
- Introduction
- Main Technical Chapters
- Conclusion
- References
- Appendices

2.2 PAPER AND DUPLICATION

To insure durability all copies must be on good quality white A4 paper. Only single-sided copies will be accepted. Photocopies must be made from the original, and all pages must have high contrast with consistently black print throughout the report. The print must be
permanent; it must not smudge. All pages must be copied onto acceptable paper, as described above.

2.3 TYPE

The type size, font, text alignment should be 12-point, “Times New Roman” and “Justified”, respectively. Bold face letters and symbols, and italics may be used for special emphasis and foreign words.

The titles of each chapter should be in all bold capital letters having font size of 18 and centered, section titles should be in 16 font size and left aligned and subsections should be in size of 14-point and left aligned. In the body of the report, different typefaces and sizes may be used to set footnotes, endnotes, examples, quotations, tables, and charts from the rest of the text, as long as they are easily readable.

No ink corrections, strikeovers, correction fluid or tape, paste-ups, insertions between lines, and leterset are permitted on the final bound copies. If you must make corrections, do them on the original manuscript before it is copied.

2.4 SPACING

The general text of the manuscript must use one-half (1.5) line spacing. Tables, long quotations, footnotes, endnotes, bibliographies, and captions may be single-spaced.

2.5 MARGINS

The left margin (binding side) must be 3 cm wide to allow for binding; the other three margins must be 3 cm wide. Narrower margins are not acceptable. Slightly larger margins are advisable, to allow for error during reproduction. Absolutely nothing must appear in the margins. This means that all headings, page numbers, text, tables, illustrations, etc., must be
contained completely within the area bounded by the margins. Full justification is recommended.

2.6 WORD AND TEXT DIVISIONS

Words must not be divided at the end of a line and may not be divided from one page to the next. Use a standard dictionary to determine word hyphenation. At least two lines of a paragraph must appear together at the top and bottom of every page. A subheading must be followed by at least 2 lines of a paragraph. There should be no indent for paragraphs. Instead paragraphs will be separated by a single line space.

2.7 PAGINATION

All page numbers of the report must appear in the bottom center on the page. Page numbers must be at least two single spaces below the nearest line of text, but within the margin boundaries as stated above. The following pagination plan should be used:

a) For the preliminary pages (starting with Title Page and ending with List of Appendices), use small Roman Numerals (i, ii, iii, iv, etc.). The title page does not have numbers but count as actual page, and the numbering should begin with ii on the statement of non-plagiarism page.

b) Use Arabic numerals beginning with "1" on the first page of the text and continue throughout the rest of the report, including appendices. All pages must be numbered consecutively, including pages containing chapter pages, illustrations, such as tables, figures, plates, and photographs.

2.8 BINDING

All reports are to be bound in spiral binding. Both covering pages of the spiral binding should be plastic, and the front cover page is required to be transparent.
CHAPTER 3

3. SPECIFIC GUIDELINES FOR THE PARTS OF THE REPORT

Two general rules of thumb should govern the presentation of any report: keep the format as simple as possible, and be consistent with the format throughout the report. You must follow the order of items within these parts as listed in Section 2.1.

3.1 TITLE PAGE

The title must be one-half (1.5) line spacing, all in capital letters, and should begin at 9 cm from the top of the page. The title must not contain chemical or mathematical formulas, symbols, superscripts, subscripts, Greek letters, or other non-standard abbreviations and characters; words must be substituted for all these. The format of the title page, including spacing and capitalization, must be exactly as in the sample title page shown in Appendix A.

3.2 STATEMENT OF NONPLAGIARISM PAGE

This page includes the statement signed by the group members about plagiarism. A sample plagiarism page is provided in Appendix B.

3.3 ABSTRACT

The abstract summarizes the content of the report. The summary must be capable of standing
in isolation so that if necessary, the reader can get the main idea of the report without detailed study. It should contain information not different from the report and summarizes the results and observations. It must not exceed 250 words, must not include diagrams, and should not include mathematical formulas unless essential. A sample abstract page is provided in Appendix C.

Keywords (and Phrases, if necessary) of your project will be given on the last line of your abstract in an alphabetical order.

3.4 ÖZET

“Özet” is the Turkish translation of the abstract, including “Anahtar Kelimeler” (gerekli ise Deyimler)”. A sample is provided in Appendix D.

3.5 ACKNOWLEDGMENT

Acknowledgment should include “thanks” to supervisor(s)/co-supervisor(s) (at the first place), people reviewing the report, persons who contributed and helped preparing the report in terms of providing support such as providing data, information, encouragement, etc. The heading Acknowledgement appears centered between the text margins 5 cm from the top of the page. The text begins at least three line spaces below the heading.

3.6 TABLE OF CONTENTS

The table of contents must list the title of each chapter and its parts and sections, references, and appendices. The wording used for all entries in the table of contents must match exactly with what is used in the text. Each entry must have leading dots which connect it to its corresponding page number.

The heading “Table of Contents” appears without punctuation centered between the text margins 5 cm from the top of the page. The listing of actual contents begins at the left
margin must be one line space below the heading. Double-space between each entry and single space within the same caption should be used.

A sample table of contents page is provided in Appendix C.

3.7 LIST OF TABLES

A list of tables should be included for the convenience of the reader if the main body contains more than table (those in appendices are excluded). It will immediately follow the table of contents on a new page.

The heading “List of Tables” appears without punctuation centered between the text margins 5 cm from the top of the page. The listing of actual contents begins at the left margin one line space below the heading.

Each entry should have the same number and the same caption or title used for a table in the text, although a long caption may be abbreviated to the extent of using only the first full sentence. As in the table of contents, each entry must have leading dots which connect it to its page number.

3.8 LIST OF FIGURES

These lists must appear on separate pages and are governed by the same rules as the list of tables.

3.9 LIST OF SYMBOLS AND/OR ABBREVIATIONS

You should follow a format consistent with acceptable practices in your discipline.
3.10 LIST OF APPENDICES

These lists must appear on separate pages and are governed by the same rules as the list of tables for the appendices.

3.11 INTRODUCTION

Introduction is the first chapter of the report, which introduces the work, provides the motivation and context and outlines the significance of this work. Therefore, Chapter 1 should be entitled as INTRODUCTION. The heading CHAPTER 1 should be centered between the text margins 5 cm from the top of the page; the title goes one line space below the heading. The text begins one line space below the title. The purpose of the introduction is to tell the reader what the report is about and should give the information required for a proper understanding of the work and the report. It should contain objectives of the report, scope of the report, definitions of any specialist terms used, the importance of the study, work plan of the study. Objectives and scope should answer questions such as: “Why was this done?”, “How does this effort fit into the overall scope of things?”, etc. Work plan includes not only the information about main chapters of the report, but also the whole chapters and contents of the study for both two semesters (including the second part of the project in the spring semester).

3.12 MAIN TECHNICAL CHAPTERS

The main body of the report is divided into multiple chapters to help the reader in understanding the subject matter. Although the detailed organization of the text varies among academic disciplines, the formatting of the text must be consistent throughout. All headings and subheadings should be presented in the same way in each chapter, in terms of capitalization, placement on the page and kind of type used.
Only chapters should begin with a new page. Within a chapter, the presentation of subsections must be continuous: partially filled pages of text are acceptable only on non-textual pages, such as those presenting tables and illustrations.

Chapters are numbered consecutively in Arabic numerals and capital letters (CHAPTER 1, CHAPTER 2, etc.). The headings of chapters are all in capitals and centered between the text margins 5 cm from the top of the page; the title goes two line spaces below. The text begins one line space below the heading. In addition to general titles like INTRODUCTION, the chapters need substantially descriptive titles that go one line space below the chapter headings.

The following chapters are to appear in the report. In Chapter 2, description of the system to be analyzed, general concepts about the project, etc. will be given. Chapter 2 may have one of the following possible titles: ANALYSIS OF CURRENT SYSTEM, EXISTING SYSTEM, GENERAL CONCEPTS, DESCRIPTION OF THE SYSTEM, etc. In Chapter 3, all related previous works and their correspondence with the underlying study will be given. Chapter 3 should have the title LITERATURE REVIEW. In Chapter 4, the used methods, theoretical backgrounds and approaches must be defined and discussed. It may have one of the following possible titles: METHODOLOGY, METHODS AND POSSIBLE APPROACHES, etc. Chapter 5 is relevant to the implementation of the proposed methodology. Results and finding are discussed and interpreted. Its title may be APPLICATION, RESULTS AND FINDINGS, or similar titles.

In many cases, the main body of the report will include certain materials other than ordinary text, such as illustrations, formulas, quotations, footnotes, and endnotes. In such cases, the following guidelines should be observed.

3.12.1 Illustrative Material

Illustrations include drawings, charts, figures, tables, diagrams, plates and photographs. These may be inserted wherever the author feels appropriate, but as a general rule, they
should appear as near as possible to the part of the text relating to them. An illustration should be separated from the text or another illustration by at least a single line space.

Illustrations of one-half page or less in length may appear on the same page with the text, separated from the text above and below by triple line spacing illustrations longer than one-half page are better placed on a separate sheet.

Illustrations that are too large to be placed sideways between the left- and right-hand margins should be rotated counterclockwise 90 degrees so that the top of the illustration runs parallel to the left-hand margin of the page. The caption or legend for such an illustration must also be rotated. When illustrations are presented in this manner, the usual margin requirements remain in effect, and page numbers should appear in their normal place.

Illustrations of any kind must be numbered consecutively. This includes appendices, if you have them. You may follow a straight sequence (1, 2, 3, etc.) or use a decimal approach (1.1, 1.2, 1.3, etc. or A.1, A.2, A.3, etc.) where the first digit is the chapter or appendix number, and the digit after the decimal point is the illustration number.

Tables may run longer than one page. In such cases all subsequent pages of the table must include at least the table number and the notation that it is continued, e.g., "Table 1 (cont’d.)" or "Table 1(continued).". This is only valid for tables; figures cannot be separated in this manner.

All headings and captions of illustrations must be prepared in the same typeface and point size used for the text. The words illustrations’ type and their numbers should be all in bold, e.g., “Table 1.2 Two-factor ANOVA Results”, “Figure A.1 Organization Chart”.

Table numbers and captions are placed single space above the top line of the illustration, figure numbers and captions are placed single space below the last line of the illustration. If an illustration other than table is borrowed from a source, then the source should be referred in
Authors may treat oversized materials in one of the following two ways:

a) An illustration may be photo-reduced, but its page number and caption must be the same size and typeface as in the rest of the illustrations.

b) An illustration may be folded and inserted in either of the following ways:

i) Fold the illustration and insert it in a white or manila envelope no larger than 16.5 by 24 cm, which may be mounted on paper of the proper weight for inclusion in the report. Each page enclosed in the envelope must be included in the pagination of the report; the page on which the envelope is mounted should have a single page number or inclusive page numbers, as needed.

ii) Fold the illustration and mount it on 21 by 29.7 cm sheet (A-4).

3.12.2 Formulas

Mathematical and chemical formulas, equations and expressions should be printed. Number the equations needed to be referred consecutively from the text. You will not number the equations which are not to be referred consecutively within the text; this means that you will not number the equations referred for once only. Be careful that all the notation you use is defined and beware of using the same mnemonic for two different variables.

Provide the reference for all equations taken from a source, including a textbook or a handout. Embed the reference in the text; do not put the reference on the same line as the equation:

“Bernoulli’s equation for incompressible flow is given by Equation 15.2 of Beckwith et al. (1982) as:

\[
\frac{P_1 - P_2}{\rho} = \frac{V_2^2 - V_1^2}{2g_c} = \frac{(Z_2 - Z_1)g}{g_c}
\]

(1)
Define all symbols immediately after they are first used:

Mechanical output power is calculated from the formula

\[ P = \tau \omega \]  \hspace{1cm} (2)

where

- \( P \) is the power (typically horsepower or watts),
- \( \tau \) is the torque (typically ft-lbf or N-m), and,
- \( \omega \) is the angular velocity in RPM (revolutions per minute).

Number each equation sequentially in parentheses as shown. The equation can then be referenced by number, e.g., "Equation (2) was used to compute motor power output.". Center equations, and number them along the right margin, e.g., see examples above.

Refer to a numbered equation with a capital “E”, e.g., “… Equation (1) …”. If you use the abbreviations "Eqn" or "Eq." and "Eqns." or "Eqs.", do so consistently. Place each equation on a separate line. Unless the equation is universally well known or very short, division should be shown on two separate lines. Equation should appear in an appropriate manner. Notice the following examples:

Not acceptable: \( Y_{\text{max}} = 3 * Pa^4 / 16 * Et * 3 * (1 - v^2) \) \hspace{1cm} (4)

Not acceptable: \( Y_{\text{max}} = 3Pa^4 / 16Et^3 (1 - v^2) \) \hspace{1cm} (5)

Acceptable: \( Y_{\text{max}} = \frac{3Pa^4}{16Et^3 (1 - v^2)} \) \hspace{1cm} (6)

Direct prose quotations of three typewritten lines or less should be incorporated into the text, enclosed in double quotation marks. Prose quotations which exceed three lines should be set off from the text in single spacing and indented in its entirety at least four spaces from the left margin, with no quotation marks at beginning or end.
3.12.3 Footnotes and Endnotes

Notes may be in the form of footnotes, placed at the bottom of each page, or endnotes, placed at the end of each chapter or at the end of the report before the references.

Footnotes and endnotes should be single-space within, and double-space between, each listing. If placed at the bottom of each page, footnotes must be separated from the text by a complete horizontal line single space above the first line of the foot note and must be written using a smaller font size.

Arabic numerals, asterisks or small letters should be used for footnotes and endnotes. In either case, the label used may appear either above the line or in parentheses even with the line.

Web address of a web document should be given in the form of footnotes, placed at the bottom of each page, wherever it is needed. The details of the web document e.g., retrieved date, should be given in REFERENCES.

3.13 CONCLUSIONS

Continuation of the main technical chapters is the last chapter, which should be entitled as CONCLUSIONS, DISCUSSIONS AND INTERPRETATIONS. The heading should be centered between the text margins 5 cm from the top of the page; the title goes two line spaces below the heading. The text begins one line space below. The title must give some overall insight into the value of your work in general and inform the reader of what the major impact is, together with any caveats which the reader should be aware of. A well thought out conclusion is essential. It should draw together all the relevant arguments and suggest or recommend the practical application of new work or possibly what further action should be taken if appropriate. Restate the major results and interpret them. The objectives, the proposed targets and findings of the project should be questioned in terms of the achievements attained. Appropriate future work should also appear at the end of this chapter.
3.14 REFERENCES

References are given in order to give the exact location of a source of information or ideas used in the document, so that the reader can refer to it later and to acknowledge the source of information or ideas used in the construction of the argument within the document. References are published works that have been cited by the writer in the text of the document. They are listed at the end of the document in a standard format. All the references should be given in an alphabetical order of the first authors’ last names. If in case of the same author(s)’s studies are cited, they should be given according to the years published in an increasing order.

All references must be specifically mentioned in the text of your report. References are cited in two different places: in text as part of the information within a sentence; or in text parenthetically not as part of the sentence’s direct information [in which case they are put into parentheses]; and in the references section. If a reference is cited by authors’ names in the text, the date should immediately follow in parentheses. The date only has to be stated the first time it is mentioned within a paragraph. When it is mentioned again in the next paragraph, the date must be restated. The names are separated by “and”. If a reference is cited parenthetically, the names and date are put in parentheses together. The names are separated by an ampersand (&). In the references section, the names are also separated by an ampersand.

Here are the two ways reference citations can appear in text:

1) “… Wheeler and Ganji (1996) give the equation for gain as …” or
2) “Gain is the ratio of output amplitude to input amplitude (Wheeler & Ganji, 1996).”

Note that both authors and dates are given in each style. Spell out the names for one or two authors. For three or more authors, use “et al.” for references. For example, instead of (“Cuttino, Woodbury, and Parker (1996) also described…”), use (“Cuttino et al. (1996) also described …”). Each reference entry should be single-spaced with double spacing between entries. Several examples of references are given below:
3.14.1 Format of References

A. Books:

a. one author

b. more than one author

d. no author
The lottery (1923), J.Watts, London.

e. translation

f. edited works

g. published or written by an organization

h. article in edited book

j. reports

k. theses


**B. Periodicals:**


**C. Web document on University Program or Department Web Site (with copyright):**


**D. Stand-alone Web document (no author, no date):**

Do not give the list of references a chapter number. The heading LIST OF REFERENCES is centered between the text margins without punctuation 5 cm from the top of the page; the list begins one line space below the heading. Each reference entry should be single-spaced with double spacing between entries.

3.15 APPENDICES

Some authors may desire to include certain materials of the report in an appendix rather than in the main body. Appendices should contain relevant supporting documentation to the work. For example, an appendix may contain test forms, detailed apparatus description, extensive tables of raw data, computer programs, etc. Do not clutter the main document with repetitive sheets of similar information. If you have these, the appendices are the place for them. Appendices should be numbered and titled. Many authors are uncertain as to what to include in the appendix section. Generally, appendices should contain relatively standard derivations and perhaps lists of parameter values, which would interfere with the continuity of the main body of the document. In particular, the appendix section should not contain:

a) All the figures corresponding to the document. Ideally these should appear alongside the appropriate text.
b) Photocopies of data sheets, or other easily-accessible material.
c) Any material which is crucial to the continuity or flow of the 'story' in the main technical sections.

If the information to be appended requires more than one appendix, each should be given a letter (Appendix A, Appendix B, etc.). The heading APPENDIX A should appear centered between the text margins 5 cm from the top of the page. The typeface and size should be those used for chapter titles.

Spacing need not be the same for each of the appendices. Documents and case studies may be single-spaced, whereas spacing for the explanations of methods and procedures may be similar to that of the main body.
Initial page number of appendices should be given in the table of contents under the heading APPENDICES. All appendices must have page numbers written in the same typeface and size used for pagination throughout the report.

If an appendix contains photocopied material, the photocopies should be of appropriate quality.
CHAPTER 4

4. SUPPLEMENTARY INFORMATION

4.1 STYLE

A report is a formal research presentation. Hence it should be written in a formal style appropriate to the discipline (e.g., impersonal style). For example, adopt the past tense throughout ("Results of the experiment demonstrated that. . .") and avoid slang and colloquialisms. Technical terms should be used where appropriate, but avoid using words and phrases that are difficult to understand when a simpler vocabulary will do just as well.

4.1.1 Style Manuals

Because stylistic conventions vary greatly from one discipline to another, you should consult with your supervisor and/or graduate coordinator regarding recommended style manuals.
PERISHABLE INVENTORY THEORY: A REVIEW

By

Mehmet KARAKAYA
M. Ali ÖZTÜRK
Kemal TÜRKÖZ
Kadir MELKE

Group No: 07

Supervisor: Prof. Dr. Ali GEÇER
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Çankaya University
Department of Industrial Engineering
Spring 2007
Appendix B: Statement of Nonplagiarism Page

We hereby declare that all information in this report has been obtained and presented in accordance with academic rules and ethical conduct. We also declare that, as required by these rules and conduct, we have fully cited and referenced all materials and results that are not original to this work.

Date: _____________________

Group Members’ Name and Surname   Signatures
Mehmet KARAKAYA   _____________________
M. Ali KARAGÖZ    _____________________
Kemal KARAKAŞ      _____________________
Kadir KARALAYAN      _____________________
In this study, an approximation is proposed to evaluate the steady-state performance of kanban controlled assembly systems. The approximation is developed for the systems with two components making up an assembly. Then, it is extended to systems with more than two components. A continuous-time Markov model is aggregated keeping the model exact, and this aggregate model is approximated replacing some state-dependent transition rates with constant rates. Decomposition of the approximate aggregate model into submodels guarantees product-form steady-state distribution for each subsystem. Finally, submodels are combined in such a way that the size of the problem becomes independent of the number of kanbans. This brings about the computational advantage in solving the combined model using numerical matrix-geometric solution algorithms. Based on the numerical comparisons the approximation is observed to be good in terms of accuracy with respect to computational burden and has the potential to be a building block for the analysis of systems that are more complex but closer to real-life applications.

**Keywords:** Assembly Systems, Approximation, Performance Evaluation, Matrix Geometric Solution, Kanban Control, Steady-State Behavior.
ÖZET

KANBAN DENETİMİNDEKİ MONTAJ SİSTEMLERİ İÇİN BİR YAKLAŞIK MODEL

Engin Topan
Yüksek Lisans, Endüstri Mühendisliği Bölümü
Tez Yöneticisi: Y. Doç. Dr. Z. Müge Avşar

Ağustos 2005, 160 Sayfa


Anahtar Kelimeler: Montaj Sistemleri, Yaklaşıklama, Performans Değerlendirmesi, Matris Geometrik Çözümleme, Kanban-Stok Denetimi, Kararlı Durum.
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