

# **MSOE Graduate Student Documentation and Style Guide For Technical Documents**

by

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**Milwaukee, WI: Milwaukee School of Engineering**

**Revised by Gary Shimek: 7 September 2007**

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## Scope Note and Procedures

### *Scope Note*

The purpose of the *MSOE Graduate Student Documentation and Style Guide For Technical Documents* is to provide graduate students in designated graduate programs at the Milwaukee School of Engineering (MSOE) with guidance on questions of format, style and documentation during the writing of required thesis work and capstone reports. In compliance with Policy 009 of the MSOE Graduate Programs Council (GPC), all thesis work and all capstone reports in the following graduate programs must comply with the format, style, and documentation requirements that are detailed in the *MSOE Graduate Student Documentation and Style Guide For Technical Documents*:

- Cardiovascular Studies (MSCS)
- Engineering (MSE)
- Environmental Engineering (MSEV)
- Perfusion (MSP)
- Structural Engineering (MSST)

A copy of GPC Policy 009 appears in Appendix D.

A student who completes a thesis or a capstone report must submit a final draft of the document to the MSOE Library for a format approval check in order to verify that the document adheres to the requirements in the *MSOE Graduate Student Documentation and Style Guide For Technical Documents*. The final draft should be submitted *after* the capstone report or thesis has been approved by the evaluation committee. When submitting a document to the library for a format check, a student must include the “Graduate Program Thesis / Capstone Report Format Approval Form.” A copy of this form is in Appendix E.

When the content of a thesis or capstone report has been approved by a committee, and when the format of the document has been approved by the library, the document is considered to be a final version. Three paper copies of the final version of the document must be submitted to the library, along with an equivalent electronic copy. The *MSOE Graduate Student Documentation and Style Guide For Technical Documents* provides guidance on the format requirements associated with these documents.

One copy of the thesis and capstone report is eventually cataloged and placed in the MSOE Library collection. Interested library users are free to check out this copy. Students who wish to restrict access to their capstone reports and thesis work must also submit a “Thesis / Capstone Report Library ‘Noncirculation Status’ Form.” See Appendix F.

For help in using the Style Guide during the writing of thesis and capstone work, students may contact the library to set up a consultation with a librarian. Contact Gary Shimek at [shimek@msoe.edu](mailto:shimek@msoe.edu) or at 414-277-7181.

*Step-By-Step Procedures for the Thesis and Capstone Report Format Check*

- Step 1.* A student who writes a capstone report or a thesis must read the *MSOE Graduate Student Documentation and Style Guide For Technical Documents*, and must write the capstone report or thesis in compliance with the format and documentation requirements in the *Style Guide*. During the writing of the capstone report or thesis, students are encouraged to contact the library to set up a consultation with a librarian for help in using the style guide. Contact Gary Shimek at [shimek@msoe.edu](mailto:shimek@msoe.edu) or at 414-277-7181.
- Step 2.* After the student's capstone report or thesis has been approved by the evaluation committee, the student is considered to have a *final draft*.
- Step 3.* The student must submit the final draft to the library for a *format check*. The purpose of the format check is to verify that the final draft complies with the requirements of the *Style Guide*. Before submitting the final draft for a formal format check, the student is encouraged to contact the library to set up a consultation with a librarian for an unofficial review of the student's work. Contact Gary Shimek at [shimek@msoe.edu](mailto:shimek@msoe.edu) or at 414-277-7181.
- Step 4.* The final draft should be submitted as a single, unbound *paper copy*. When submitting the final draft for a format check, the student should also fill in the top portion of the "*Graduate Program Thesis / Capstone Report Format Approval Form*," and submit the Form along with the copy of the final draft. See Appendix E.
- Step 5.* The format check process may entail a series of exchanges of versions of the final draft. That is, a student may submit a final draft that requires format corrections. The student receives feedback from the library concerning the necessary corrections. The student makes the corrections, and submits to the library a corrected version of the final draft for a second format check. This process continues until the library verifies that the final draft complies with the *Style Guide*.
- Step 6.* When the library approves the format of the capstone report or thesis, the student is considered to have a *final version*. The library communicates to the student and the student's advisor that the final version is approved. The library asks the student to submit (i) three unbound paper copies of the final version (see Section 1.1.1.), (ii) an electronic copy of the final

version (see Section 1.1.2.), and three original signed and dated Project Approval Forms (see Section 1.1.5.13.).

- Step 7.* The student submits to the library items (i), (ii), and (iii) from *Step 6*, and the library verifies that the items are in proper condition, and that no further problems exist.
- Step 7.A.* If the student desires to limit public access to the capstone report or thesis, the student must fill out and submit to the library the “Thesis / Capstone Report ‘Noncirculation Status’ Request.” See Appendix F.
- Step 8.* Library personnel sign the Format Approval Form and send it – along with a paper copy of the final version – to the Program Director of the appropriate academic program. Library personnel notify the student and advisor that the format check is officially completed. The student is additionally notified of the option to purchase personal copies of the final version that are bound. See Appendix C.

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## Chapter 1.

### ELEMENTS OF A FORMAL CAPSTONE REPORT OR THESIS AND BASIC FORMAT AND STYLE ISSUES

In a capstone report or a thesis, the writer must employ an organizational structure that enables multiple readers – in an efficient manner -- (a) to find information, and (b) to understand the information. *Standardized formal elements* and *standardized format requirements* are the tools which enable writers to organize their work in a disciplined and coherent manner.

#### 1.1. Formal Report Formatting Requirements for Capstone Projects and Thesis Documents.

At MSOE, students who submit either a capstone report or a thesis in the MSCS, MSP, MSE, MSST, and MSEV programs must include formal elements in their documents. These formal elements are the major sections, or the major parts, of a capstone report or a thesis. Students must also use standardized formats in the capstone report or thesis.

##### 1.1.1. General Format Requirements for Capstone Reports and Thesis Documents.

The capstone report or the thesis shall be neatly printed with double-spaced type. The capstone report or thesis shall be single-sided, unbound, and on paper that is 8.5 x 11 inches in size (*i.e.*, 21.6 x 27.9 cm). As a general rule of thumb, the page layout for any page of the text should be rendered in portrait layout, although it is acceptable to place figures, tables, maps, and other special materials in a landscape layout. The appendices, if included, may use single-spaced type. Each student is expected to use a commercially available computer-based word-processing tool to prepare the document and to create a file containing the document. The student is required to submit to the library three paper copies of the final version of the document. The copies shall be of laser printer quality, on 20-lb. multipurpose paper. A better-quality paper may also be employed, if desired. The copies must be neat, clean, clearly legible, and without folds, smudges, tears, or other flaws. All copies of the document should be unbound, but may be held together by a large paper clip or other fastener.

##### 1.1.1.1. White Space

Use sufficient white space (but not excessive amounts – usually, no more than two spaces) around figures and tables so that these visual items stand out. Use sufficient white space on pages so that pages are readable and visually appealing. Use white space between a visual item and its caption (one space), and between the caption and the surrounding text (one or two spaces). See Section 1.1.7.

Use white space around headings, *between* sections, and at the *ends* of sections.

Do not allow white space to appear *within* sections in the Body of the document.

Occasionally, when working with a series of visual items (i.e., figures and tables), some writers mistakenly permit a block of white space to appear after a visual item. Writers do this because enough space does not exist to place the next figure. Instead, the writer allows white space to appear, and this space is followed by another visual item on the subsequent page, which is also followed by white space – until the text eventually resumes. Try to avoid this type of layout. Instead, simply move the text that eventually follows into the white space. Some writers are not comfortable with this solution, because they wish to retain a visual item and its explanatory text on the same page. This alignment of visual item with its text on the same page is not necessary – as long as (i) visual items are properly captioned, (ii) clear internal references to visual items are employed (e.g., do not write “the figure below” – use the specification figure designation), and (iii) visual items do not appear before they are mentioned in the text. See Section 1.1.7.

### **1.1.2. Required Electronic Copy**

A single electronic copy of the final version of the document must be submitted to the library on a suitably-identified CD-ROM after the content and the format of a capstone report or thesis have been approved. The CD-ROM shall be protected in a case or container; the case or container shall feature the following information:

- The name of the student
- The title of the document
- The student’s academic program
- The date

The electronic copy must be the same as – or equivalent to – the paper copy of the document. An equivalent electronic copy must, of course, feature the same content as that of the paper copy, but the content may be deployed in more than one file, if required.

The required format for the electronic copy is Word (.doc)[read-only], or Adobe Acrobat (.pdf).

The electronic copy of the document serves as a backup copy. As such, it is not available to the public.

### **1.1.3. Margins and Page Numbering**

The final version of the thesis or capstone report shall have a one-inch margin (i.e., 2.54 cm) at the top, bottom, and right-hand side of each page, and a 1.5-inch (i.e., 3.81 cm) margin on the left-hand side of each page. The 1.5-inch margin on the left-hand side of each page will allow for binding of the document. Unless prohibited by reasons associated with intellectual property law, the university binds one copy of all thesis documents and capstone reports, and makes this copy available for checkout.

The intent of the 1.5-inch left hand margin requirement is that the entire text of the work shall feature a 1.5-inch left hand margin, not merely the text of section headings.

Each page, including the References section and appendices, shall be numbered in the upper-right corner, with the exception of the title page which shall not be numbered. Neatly-rendered page numbering by hand is acceptable for those pages that cannot be numbered normally because of the appearance of visual material. The Abstract, which immediately follows the title page, shall begin on the second page which will be marked "2" in the upper-right corner. The page number which appears in the upper-right corner need not be within the top margin; the ideal position for the page number is 0.5 inch from the top edge and one inch from the right edge of the paper.

#### **1.1.4. Sections or Elements in the Thesis and Capstone Report**

The following sections or elements -- in the following order -- are permissible items in a thesis or a capstone report. Other sections (such as a "List of Equations," or a "List of Charts") are not permitted. Only those sections listed here are acceptable.

Title Page  
 Abstract  
 Acknowledgments  
 Table of Contents  
 List of Figures  
 List of Tables  
 Nomenclature  
 Glossary  
 Body of Report  
 References  
 Bibliography  
 Appendices  
 Copy of Project Approval Form

Each thesis and capstone report *must* include the following sections: Title Page, Abstract, Table of Contents, List of Figures (unless the document contains no figures), List of Tables (unless the document contains no tables of data), Body of Report, References, and Project Approval Form. Other elements are optional.

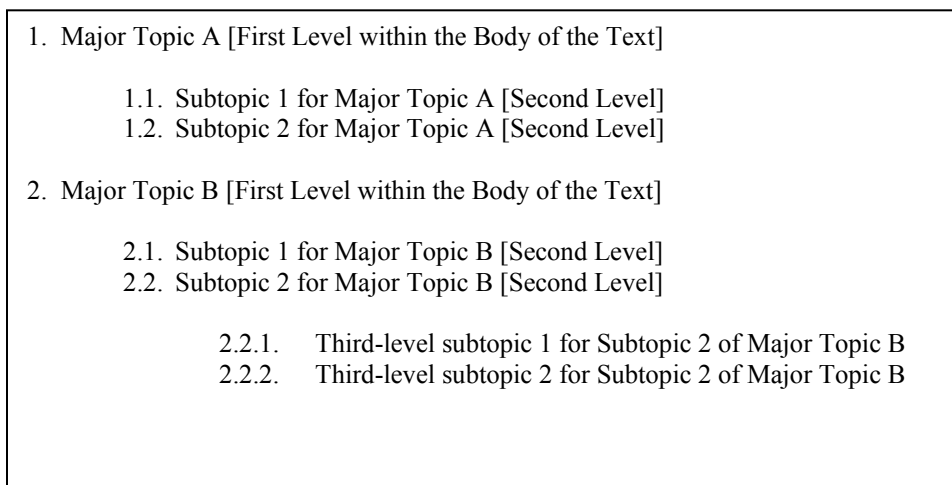
##### **1.1.4.1. Section Numbering**

Do not number the major sections in a thesis or capstone report. That is, do not number the Abstract, Acknowledgments, Table of Contents, List of Figures, List of Tables, Nomenclature, Glossary, References, Bibliography, and Appendices sections. Do not use numbering within these sections, either.

Within the Body of the document, numbering of sections and their corresponding headings is not required, but such numbering is permitted and recommended. Use numbers to designate sections and their corresponding headings within the Body of the document, if desired. If numbering is employed, each major section shall be given a

consecutive number, i.e., "1," "2," "3," and so on. Second-level subsections shall be identified as "1.1," "1.2," "1.3," and so on. Third-level subsections shall be given a consecutive number, i.e., "1.1.1," "1.1.2," "1.1.3," and so on. Lower-level subsections shall follow a similar numbering pattern.

Be sure to number sections in a logically correct manner. With respect to logical organization and structure, all subsections within a major section should belong within the major section. Figure 1 features a correct organizational structure.



**Figure 1: Correct Organizational Structure.**

If a thesis or capstone report contains appendices, the sections of each individual appendix may feature numbering, but the numbering shall not be a continuation of the numbering in the Body of the document, nor the numbering of the previous appendix. For example, if the final section of the Body of a document is numbered Section 8, then the first section of Appendix A would be Section 1, not Section 9.

Regardless of whether or not numbering is used in the Body of document, the student should develop a system to help the reader quickly determine the difference between types of sections and their corresponding headings. For example, the following system might be employed:

*First-level major section heading:* **14-Point Arial Bold**  
*Second-level Subtopic of major section heading:* **12-Point Arial Bold**  
*Third-level subtopic of a subtopic:* *12-Point Arial Italic*

And so forth.

Do not use a full colon after a heading, unless the full colon is grammatically required.

Avoid “hanging headings” (also known as “orphan headings”) in the Body of the document. A “hanging heading” occurs when the heading for a section appears on the

bottom of a page, but the text associated with the heading appears on the following page. Either move the heading to the following page so that it resides with its text, or place at least one line of text from the section on the page where the heading resides.

### **1.1.5. Details for Each Document Section**

#### **1.1.5.1. Title Page**

The elements of the title page should be placed in such a manner that the majority of the length of the page is employed. The page should comply with margin requirements. The title should be rendered in 14-pt. bold font; the remainder of the page shall feature 12-pt. non-bold font.

Examples of title pages from a capstone report (in the MSEV program) and from a thesis (in the Perfusion program) appear on the following pages.

**Anaerobic Digestion and Dairy Farms:  
Strategies for Recovering Beneficial Products from Dairy Manure**

by

Luke Honeythunder

A Report Submitted to the Faculty of the  
Milwaukee School of Engineering  
in Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Environmental Engineering

Milwaukee, Wisconsin

May 2007

**Cavitation in the Cardiopulmonary Bypass Circuit:  
A Meta-Analysis of Studies in the Perfusion Literature**

by

John Podsnap

A Thesis Submitted to the Faculty of the  
Milwaukee School of Engineering  
in Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Perfusion

Milwaukee, Wisconsin

May 2007

### **1.1.5.2. Abstract**

The Abstract shall provide a description of the investigation undertaken in the thesis or capstone report. The Abstract shall not be longer than one page, and it must contain the following three critical elements:

- (i) A statement of purpose of the project or its objective
- (ii) A statement of the methodology employed to conduct the investigation
- (iii) A statement of the major findings and conclusions

The Abstract may be single-spaced.

The Abstract shall not feature visual items, reference numbers, other types of documentation, and direct quotations.

The Abstract must be a unique representation of the thesis or report; that is, it must not incorporate large amounts of verbatim material from the main text, especially the Introduction in the Body of the document.

Begin the Abstract on a new page.

### **1.1.5.3. Acknowledgments**

This section is mandatory if substantive assistance was received in carrying out the project which is described in the thesis or capstone report. Otherwise, this section is optional, although students are urged minimally to acknowledge the assistance of advisors and committees.

If included, the Acknowledgments section shall be on a separate page. If there was any substantive contribution from others in the work performed on the project, then the acknowledgment shall be specific about such contribution so as to properly give credit. Some students use this section to give personal thanks to others offering general support; such usage of this section is permissible.

The American spelling of the word “acknowledgments” (without an “e” after the “g”) is required in the thesis and capstone report.

Begin the Acknowledgments section on a new page.

### **1.1.5.4. Table of Contents**

The Table of Contents shall list with page numbers all section headings and subsection headings of the document except the Title Page, Abstract, Acknowledgments, and the Thesis or Report Approval Form. The Table of Contents should not list individual figures and tables, because these items are listed separately in sections that immediately follow.

The Table of Contents begins with the section that follows it. Typically, this section is the List of Figures.

The Table of Contents must list all of the first-level and second-level section headings in the Body of the thesis or capstone report, together with their page numbers. Lower-level headings may also be listed, if desired. The Table of Contents should include listings for appendices, if any.

Sufficient white space should exist in the layout of the Table of Contents so that readers can quickly and efficiently read the headings. Avoid a ‘crammed’ appearance.

Use ellipses – or a series of dots – to connect headings with their corresponding page numbers. This technique enables the reader to quickly discern page numbers. If a heading exceeds the length of one line, simply wrap it around before it intrudes into the page number column, and extend the dots from the second line. For example:

Here is the First Heading in my Capstone Report .....	6
Here is the Second Heading in my Capstone Report .....	7
Here is the Third Heading in my Capstone Report and It’s a Really Long Heading Because It Needs to Express A Lot .....	9

Headings and page numbers must be accurate. Headings in the Table of Contents must match precisely their corresponding headings in the Body of the document, including upper- and lower-case lettering.

Begin the Table of Contents on a new page.

#### **1.1.5.4.1. Example of a Table of Contents**

An example of a Table of Contents appears on the following two pages.

## Table of Contents

List of Figures .....	6
List of Tables .....	7
Nomenclature .....	8
Glossary .....	10
Chapter 1: Introduction, Literature Review, and Elementary Theories .....	11
1.0 Introduction .....	11
1.0.1 Description of the Project .....	11
1.0.2 Justification of the Project .....	15
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### 1.1.5.5. List of Figures

Include the List of Figures only if figures exist in the capstone report or thesis. Examples of figures include drawings, photographs, maps, graphs, and charts. Include all figures that appear in the Body of the document. Do not include figures that may appear in the appendices: these figures are handled in a different manner. See the section on Appendices in this style guide.

In the List of Figures, list the designation of the figure (*e.g.*, “Figure 1”) and its caption, along with the page number on which the figure appears.

Sufficient white space should exist in the layout of the List of Figures so that readers can quickly and efficiently read the figure captions. Avoid a ‘crammed’ appearance.

Use ellipses – or a series of dots – to connect figure captions with their corresponding page numbers. This technique enables the reader to quickly discern page numbers. If a caption exceeds the length of one line, simply wrap it around before it intrudes into the page number column, and extend the dots from the second line. For example:

Figure 1: Here is the First Figure Caption in my Capstone Report ..... 6

Figure 2: Here is the Second Figure Caption in my Capstone Report ..... 7

Figure 3: Here is the Third Figure Caption in my Capstone Report and  
It’s a Really Long Caption Because It Needs to Express A Lot ..... 9

Figure designations and captions in the List of Figures may be rendered in **bold**, if desired.

Figure designations, figure captions, and page numbers must be accurate. Designations and captions in the List of Figures must match precisely their corresponding designations and captions in the Body of the document, including upper- and lower-case lettering.

In the List of Figures, figure captions shall not feature reference numbers, although figure captions may feature reference numbers within the body of the report.

Begin the List of Figures on a new page.

### 1.1.5.6. List of Tables

Include the List of Tables only if tables exist in the capstone report or thesis. Tables feature columns of numbers or quantities. Include all tables that appear in the Body of the document. Do not include tables that may appear in the appendices: these tables are handled in a different manner. See the section on Appendices in this style guide.

In the List of Tables, list the designation of the Table (*e.g.*, “Table 1”) and its caption, along with the page number on which the table appears.

Sufficient white space should exist in the layout of the List of Tables so that readers can quickly and efficiently read the table captions. Avoid a ‘crammed’ appearance.

Use ellipses – or a series of dots – to connect table captions with their corresponding page numbers. This technique enables the reader to quickly discern page numbers. If a caption exceeds the length of one line, simply wrap it around before it intrudes into the page number column, and extend the dots from the second line. For example:

Figure 1: Here is the First Table Caption in my Capstone Report .....	6
Figure 2: Here is the Second Table Caption in my Capstone Report .....	7
Figure 3: Here is the Third Table Caption in my Capstone Report and It’s a Really Long Caption Because It Needs to Express A Lot .....	9

Table designations and captions in the List of Tables may be rendered in **bold**, if desired.

Table designations, table captions, and page numbers must be accurate. Designations and captions in the List of Tables must match precisely their corresponding designations and captions in the Body of the document, including upper- and lower-case lettering.

In the List of Tables, table captions shall not feature reference numbers, although table captions may feature reference numbers within the body of the report.

Begin the List of Tables on a new page.

### **1.1.5.7. Nomenclature**

Use this section to define the symbols employed in the report. The list should be alphabetized with English letters first, followed by Greek symbols.

Include definitions of acronyms and abbreviations in the Nomenclature section, as well, but list symbols first with a “Symbols” heading, followed by acronyms and abbreviations with an “Abbreviations” heading. If no symbols are employed in the document, but abbreviations are, then simply list the abbreviations. Acronyms and abbreviations that begin with numbers should be listed after those that begin with letters. In addition to defining acronyms and abbreviations in the Nomenclature section, define acronyms and abbreviations in the Body of the document when the acronyms and abbreviations are first used.

Only definitions of symbols and acronyms and abbreviations are permitted in the Nomenclature section.

It is occasionally necessary to document material that appears in the Nomenclature section. Because the Nomenclature section is not part of the Body of the capstone report or thesis, the documentation employed should not be a continuation of the References used in the body of the report. Instead, the material requiring documentation should be footnoted at the bottom of the page. See Section 1.1.8. The format of a work cited in a footnote should comply with the format recommendations for references cited in the text.

Employ a layout that enables a reader to read and to understand the nomenclature in the document in a quick and efficient manner.

Begin the Nomenclature section on a new page.

#### **1.1.5.7.1 Example of a Nomenclature Section**

An example of a Nomenclature section appears on the following page.

## Nomenclature

### *Symbols*

$A$  = wetted area, or frontal area

$d, D$  = diameter

$g$  = acceleration due to gravity

$h$  = channel width

$l, L$  = length

$p$  = pressure

### *Abbreviations*

ARC            Aeronautical Research Council

R & M        Reports and Memoranda

ASME        American Society of Mechanical Engineers

AVA          Aerodynamische Versuchsanstalt Gottingen

### **1.1.5.8. Glossary**

Whereas the Nomenclature section of a report is devoted to symbols and acronyms and abbreviations, the Glossary should define technical terms and jargon related to the topic of the report.

Include only definitions of terms in the Glossary. Visual items are not permitted.

The Glossary is an optional element, but should be included if the capstone report or thesis features a large number of technical terms. A technical term that is employed throughout the document should appear in a Glossary.

It is occasionally necessary to document material that appears in the Glossary section. Because the Glossary section is not part of the Body of the capstone report or thesis, the documentation employed should not be a continuation of the References used in the body of the report. Instead, the material requiring documentation should be footnoted at the bottom of the page. See Section 1.1.8. The format of a work cited in a footnote should comply with the format recommendations for references cited in the text.

Employ a layout that enables a reader to read and to understand the technical terms and jargon in the document in a quick and efficient manner.

Begin the Glossary on a new page.

### **1.1.5.9. Body of the Capstone Report and Thesis**

The Body of the capstone report and thesis -- or the document's main text -- shall be organized in a logical manner. First-level, second-level, and lower-level sections shall be properly headed (see Section 1.1.4.1.).

Most capstone reports and thesis documents shall feature most – if not all – of the following elements in the structure of the document.

#### *Introduction*

The Introduction describes the topic that is addressed in the capstone report or thesis, as well as the project or investigation that was undertaken by the student. The Introduction usually provides a “big picture” context for the problem or topic addressed. This part of the document should help the reader to understand the nature of the topic, and why it is important.

#### *Background*

The Background expands further on the problem, topic, or investigation addressed. The Background typically describes and summarizes the work that has been carried out in the past to address the problem or topic that is discussed in the capstone report or thesis. The Background may also describe important issues. The student may discuss legal concerns, relevant standards, and important patents. Often, writers use a literature review in the Background section to discuss how others have addressed the problem or the topic, although sometimes a Literature Review is treated as a separate element.

### *Literature Review*

A Literature Review should selectively summarize in a coherent manner the important information in the relevant literature associated with the topic or problem that is addressed by the capstone report or thesis. A Literature Review does not simply list and briefly describe documents. Rather, a good Literature Review may serve a number of purposes. It may suggest possible solutions and answers to technical issues; it may supply information on relevant standards and patents; it may document that the topic or problem addressed in a thesis or capstone report is relevant, and that the student's solution is unique. Some writers treat the Literature Review as part of the Background section of a thesis or capstone report; others handle the Literature Review as a separate section: both options are acceptable.

### *Methods*

This section of the capstone report or thesis describes the methods and materials employed by the student to investigate the topic or problem addressed.

### *Results and Discussion*

The results of the student's investigation and work are described in this section. Details may be included about technical performance, economic impact, cost analysis, or other issues, if applicable (such as in projects where students must assess environmental impacts).

### *Conclusions and Recommendations*

The student shall describe important conclusions and recommendations in this section. This part of the document may include details about flaws, problems, or lessons learned. Future investigations may also be recommended.

To encourage a clear and logical organization, the use of chapter divisions is strongly recommended. How chapters are deployed is, of course, based on the organization and structure of the thesis or capstone report. One student might use Chapter 1 to introduce the topic, Chapter 2 to discuss the background and the literature review, Chapter 3 to discuss methods, Chapter 4 to discuss results, and Chapter 5 to discuss conclusions and recommendations. Another student might use Chapter 1 to introduce the topic and background; Chapter 2 to discuss the literature review; Chapter 3 to discuss the methods; Chapters 4 and 5 to discuss various results, which might be extensive; and Chapter 6 to discuss conclusions and recommendations. An effective method for determining the chapter divisions in your capstone report or thesis is to use an outline of the document; if the outline progresses logically, natural divisions should suggest themselves.

Each chapter and major section designated by a first-level heading shall begin on a new page.

#### **1.1.5.10. References Section**

In the capstone report and the thesis, this section should list--in order of appearance--each source cited in the main text, together with the source's reference number. Each source shall be fully documented according to the requirements detailed in Section 2 of this style

guide. The References section should include *only* those sources cited in the Body of the document.

The determination of which references to include in the References section is based exclusively on the references that appear in the Body of the document.

For example, the appearance of [1] in the main text of the document indicates that a source is being cited. In this case, since it is the first time a source is being cited, the source is assigned the same *reference number* in the *References* section, and also appears as the first source listed, or rather, the first *reference entry*. The appearance of the *reference number* [1] in the main text thus refers the reader to the *References* section, where the first *reference entry* (or source) to appear is the first to be cited, and is indicated as such with *reference number* [1]. In the main text, whenever the source is cited, reference number [1] is used to refer to the source.

The second source cited in the text would be assigned reference number [2]; it would appear as reference [2] in the References section, and every time the work was cited in the text, it would be cited as reference number [2].

The third source cited in the text would be assigned reference number [3]; it would appear as reference [3] in the References section, and every time the work was cited in the text, it would be cited as reference number [3].

This explanation illustrates that within the Body of the capstone report and thesis, references shall be numbered consecutively in square brackets, such as the reference notation at the end of this sentence [1]. The punctuation mark at the end of a sentence shall follow the bracket, as in this example [2] – except in the case of direct quotations, when the reference number shall appear outside of the final quotation mark.

In the main text, do not use the word reference, as in "reference [3]" or "Ref. [3]," except at the beginning of a sentence (as in "Reference [3] contains the first development of ... ") or when comparing contents of references (as in "Reference [4] used a time-domain approach whereas reference [5] used a ...").

Begin the References section on a new page.

#### **1.1.5.11. Bibliography**

The Bibliography is an optional element. If it is included, it should feature a list of works consulted by the student in the production of the capstone report or thesis. The Bibliography may include all of the works cited as references (see Section 1.1.5.10.) in addition to those works that were consulted but not cited.

Alternatively, the Bibliography may include only those works that were consulted but not cited in the text.

Works listed in the Bibliography should be in the same format as works listed in the References section. Works listed in the bibliography should be arranged alphabetically by author. If a work does not feature an author, use the title as the main element of the entry. Works listed in the Bibliography should not be numbered.

Begin the Bibliography on a new page.

#### **1.1.5.12. Appendices**

An Appendix supplements the Body of a capstone report or thesis. An Appendix may feature additional useful explanatory or statistical information which comments upon, or expands in more detail, the information and results that are discussed in the Body of the capstone report or thesis. An Appendix may include a large range of materials, but all material in an Appendix should be related to the capstone report or thesis, and as a general rule of thumb, material in an Appendix is material that would "clutter" the body of a capstone report or thesis with too much detail.

Each Appendix in a report shall be designated and labeled, and each Appendix shall begin on a new page. Each Appendix should be listed in the Table of Contents. A letter designation is required for each Appendix. Thus:

Appendix A: This is my First Appendix.

Appendix B: This is my Second Appendix.

Appendix C: This is my Third Appendix.

Some examples may help to clarify material that should be placed in an appendix rather than in the Body of a capstone report or thesis:

- (i) A report may discuss an investigation in which a survey was conducted. The report itself would be more concerned with the results of the survey, but it would be appropriate (in fact, it would be necessary) to place the survey instrument itself and the raw data from the survey in appendices.
- (ii) Product catalogs or detailed product specifications are more appropriately placed in appendices.
- (iii) The complete set of data derived from an experimental investigation is generally consigned to an Appendix.
- (iv) The actual code of a program developed in conjunction with a capstone report or a thesis is more appropriately placed in an Appendix.

It is occasionally necessary to document material that appears in an Appendix. Because an Appendix is not part of the body of the report, the documentation employed should not be a continuation of the references used in the Body of the document. Instead, the material requiring documentation should be footnoted at the bottom of the page. See Section 1.1.8. The format of a work cited in a footnote should comply with the format recommendations for references cited in the text.

The requirement to use footnotes in the appendices entails a number of procedures, including the following:

- Each Appendix must feature its own set of footnotes. For example, Appendix A might have footnotes 1, 2, 3, 4, and 5; Appendix B might have footnotes 1, 2, and 3; Appendix C might have footnotes 1, 2, 3, 4, 5, 6, 7, and 8; and so on.
- All visual material in an Appendix (i.e., figures and tables) that needs to be documented must be documented with *footnotes* – not a continuation of the references used in the Body of the document. Footnote the caption of the visual item in order to document the item.
- All written material in an Appendix that needs to be documented must be documented with *footnotes* – not a continuation of the references used in the Body of the document.
- Footnote numbering used in the Body of the document should not be continued in the appendices.

A similar procedure is required with respect to visual items and equations. Visual items and equations are permissible in the appendices, but the designation of those items should not continue the designation of visual items and equations in the main text. Instead, visual items and equations should be designated in a manner that incorporates the designation of the Appendix.

For example, Appendix A may feature three figures and two tables. These items should be designated Figure A-1, Figure A-2, Figure A-3, Table A-1, and Table A-2, respectively. Appendix B may feature two figures and four tables. These items should be designated Figure B-1, Figure B-2, Table B-1, Table B-2, Table B-3, and Table B-4, respectively. Designations and captions of visual items in the appendices do not need to be listed in the List of Figures and the List of Tables. For details on the numbering of equations in an Appendix, see Section 1.1.10.6.

### **1.1.5.13. Capstone Report or Thesis Approval Form**

The final page of the capstone report or thesis should feature the Capstone Report or Thesis Approval Form. After a committee has approved the content of a capstone report or a thesis, and after the document's format has been approved, three paper copies of the Approval Form must be signed and dated by the members of the student's evaluation committee. The three paper copies are submitted to the library, along with the three paper copies of the final version of the capstone report or thesis. The equivalent

electronic copy of the document shall also feature an Approval Form, although the Form is, of course, unsigned in the electronic version.

The Approval Form should be the last page of the capstone report or thesis. The Approval Form should feature a page number, but the Form should not be listed in the Table of Contents.

The Approval Form states the student's academic program, the student's name, and the title of the student's thesis or capstone report. The Form additionally shall include the names of the members of the student's committee.

#### **1.1.5.13.1. Examples of Approval Forms**

The following pages feature examples of Approval Forms for each of the graduate programs at MSOE that require compliance with this style guide.

**Cardiovascular Studies****Thesis Approval Form****Master of Science in Cardiovascular Studies -- MSCS****Milwaukee School of Engineering**

This thesis, entitled "Preparation of the Cardiac Patient for Cardiac Surgery: A Meta-Analysis," submitted by the student Samuel Pickwick, has been approved by the following committee:

Faculty Advisor: \_\_\_\_\_

Date: \_\_\_\_\_

Dr. Ron Gerrits

Faculty Member: \_\_\_\_\_

Date: \_\_\_\_\_

Dr. Larry Fennigkoh

Faculty Member: \_\_\_\_\_

Date: \_\_\_\_\_

Dr. Charles Tritt

**Engineering****Capstone Report Approval Form****Master of Science in Engineering -- MSE****Milwaukee School of Engineering**

This capstone report, entitled "The Environmental Impact of Electromagnetic Radiation from High-Power Spot-Beam Transmitters within Satellites," submitted by the student James H. Pratt, has been approved by the following committee:

Faculty Advisor: \_\_\_\_\_

Date: \_\_\_\_\_

Dr. Edward Chandler

Faculty Member: \_\_\_\_\_

Date: \_\_\_\_\_

Professor Hue Tran

Faculty Member: \_\_\_\_\_

Date: \_\_\_\_\_

Dr. Robert Strangeway

**Environmental Engineering****Capstone Report Approval Form****Master of Science in Environmental Engineering -- MSEV****Milwaukee School of Engineering**

This capstone report, entitled “Anaerobic Digestion and Dairy Farms: Strategies for Recovering Beneficial Products from Dairy Manure,” submitted by the student Luke Honeythunder, has been approved by the following committee:

Faculty Advisor: \_\_\_\_\_ Date: \_\_\_\_\_

Dr. Carol Diggelman

Faculty Member: \_\_\_\_\_ Date: \_\_\_\_\_

Dr. Deborah Jackman

Faculty Member: \_\_\_\_\_ Date: \_\_\_\_\_

Dr. Frank Mahuta

**Perfusion****Thesis Approval Form****Master of Science in Perfusion -- MSP****Milwaukee School of Engineering**

This thesis, entitled "Cavitation in the Cardiopulmonary Bypass Circuit: A Meta-Analysis of Studies in the Perfusion Literature," submitted by the student John Podsnap, has been approved by the following committee:

Faculty Advisor: \_\_\_\_\_

Date: \_\_\_\_\_

Dr. Ron Gerrits

Faculty Member: \_\_\_\_\_

Date: \_\_\_\_\_

Dr. Larry Fennigkoh

Faculty Member: \_\_\_\_\_

Date: \_\_\_\_\_

Dr. Charles Tritt

**Structural Engineering****Capstone Report Approval Form****Master of Science in Structural Engineering -- MSST****Milwaukee School of Engineering**

This capstone report, entitled "Fabric-Formed Concrete Panel Design," submitted by the student Robert P. Schmitz, has been approved by the following committee:

Faculty Advisor: \_\_\_\_\_ Date: \_\_\_\_\_

Dr. Hans-Peter Huttelmaier

Faculty Member: \_\_\_\_\_ Date: \_\_\_\_\_

Dr. Richard DeVries

Faculty Member: \_\_\_\_\_ Date: \_\_\_\_\_

Dr. Mahmoud Maamouri

### 1.1.6. Type Sizes, Typefaces and Justification

The best results will be obtained if the computer-based word processor used to create the document has several type sizes. A 12-point type size should be used throughout the capstone report or thesis. However, direct quotations, the appendices, figures, and tables of data can use a 10-point type size. The page numbers printed in the upper-right corner of each page can also use a 10-point type size. The designations and captions of figures and tables may also employ 10-point type size. As an aid in gauging type size, 1 point is approximately 0.35 mm. The size of the lowercase "j" will give the point size.

If the Table of Contents features listings for lower-level headings, these listings may be rendered in 10-point type size.

A 14-point type size is permissible for the title on the Title Page, in addition to the main heading for the major elements of the document (*e.g.*, "Abstract," "Acknowledgments," "Table of Contents," and so forth, *sans* quotation marks). First-level headings in the Body of the document may also feature 14-point type size.

A font size less than 10-point should not appear in the Body of the capstone report or the thesis, with the exception of type size that is an unavoidable part of a visual item.

Use a proportional, serif typeface such as Times New Roman. A non-serif typeface (such as Arial) is permissible for the title on the Title Page, as well as headings in the main text (but not in the Table of Contents).

It is best if all of the Roman symbols that are used for quantities and variables are italicized wherever they appear in text or in equations. However, mathematical operators such as "+" and "=" should not be italicized. Greek symbols used as variables should not be italicized.

The printed text in the Body of the document shall be left-justified.

### 1.1.7. Figures and Tables

#### 1.1.7.1. Using Figures and Tables

Only two types of visual material are permitted in the capstone report and thesis: figures and tables. A figure might be an illustration, a drawing, a map, a photograph, a chart, or a diagram. Each of these items must be referred to as a "figure." A table, on the other hand, consists of information or data arranged into rows and columns by category and type. Tables simplify access to individual pieces of information.

Consider carefully whether or not to include visual items in your capstone report. Writers use visual items for one or more of the following reasons:

- Clarity: A visual item might clarify trends, changes, complex situations, or large quantities of data.
- Simplification: A visual item might facilitate the comprehension of a complex entity or situation by breaking it into parts or components.
- Emphasis: Use a visual item to highlight the important ideas in a document.
- Summarization: Carefully-designed visual items can summarize the most important ideas in a document.
- Reinforcement: Consider the use of visual items to reinforce significant concepts, ideas, and points.
- Interest: If appropriate, consider the use of visual items as a method for breaking up lengthy narrative text, thus making the text more readable.
- Impact: Some research suggests that some readers recall visual items better than text.
- Credibility: Some research suggests that well-designed visual items contribute to credibility.
- Coherence: Similar design elements in visual items throughout a document can contribute to the coherence of the document.

#### **1.1.7.2. Positioning of Figures and Tables**

Whenever possible, figures and tables should each be positioned at the top or bottom of a page. Avoid placing them in the middle of pages, if possible.

Do not place a visual item before it is referred to in the text.

If appropriate, visual items may be placed in landscape orientation, but the bottom of the page is still considered to be the same as that of a page featuring portrait orientation.

Avoid placing all visual material after the main text simply because it may be more convenient to do so; good reasons should exist for relegating all visual materials after the main text.

#### **1.1.7.3. Referring to Figures and Tables**

Refer in the text to each figure or table that appears. Often, this reference is a mere description. For example, you might write: “Figure 2 summarizes the number of Wisconsin firms that have outsourced activities to Eastern Europe.”

Do not use directional indications when referring to visual items. Refer to a visual item by its designation, either as part of a sentence or parenthetically. Thus:

This study, as shown in Figure 8, confirms Hamel’s theories on blood clotting.

This study confirms Hamel’s theories on blood clotting. (See Figure 8.)

Do not refer to a visual item by position: it is needlessly redundant. Always refer to the item simply by its designation. Thus, “See Figure 8” is correct, but “See Figure 8 below” is not; neither is “See the figure below.”

Do *not* introduce visual items with a colon. For example, the following excerpt is incorrect.

Our work clearly demonstrates the existence of giant muskies in Pewaukee Lake. Table 7 summarizes the unusual growth rates of Pewaukee Lake *Esox masquinongy* versus standard growth rates:

**Table 7: *Esox masquinongy* Growth Rates.**

Age	TL (mm) Pewaukee Lake	TL (mm) Standard
Hatched Fry	13 – 18	13 – 18
1 month	50 – 97	43 – 76
2 month	150 – 225	104 – 178
5 month	275 – 560	147 – 312
1 year	580 – 1012	136 – 454
3 year	1050 – 10900	318 – 5443

In the example, simply replace the colon following “growth rates” with a period.

Within the text, when referring to a figure or a table, you may always use lower case letters (as in “... the results are shown on figure 7 and listed in table 13 ...”), or use upper case “F” and “T” (as in “... the results are shown on Figure 7 and listed in Table 13 ...”), but be consistent in style throughout the report.

#### **1.1.7.4. Designations and Captions of Figures and Tables**

A figure and a table each must feature a *designation* and a *caption*.

Figures and tables in the capstone report or thesis shall be designated with consecutive numbers (*e.g.*, Figure 1, Figure 2, Figure 3, and so on; Table 1, Table 2, Table 3, and so on). Following the designation of a visual item, a dash, a full colon, or a period should appear. Thus:

**Figure 1 –**

**Figure 1:**

**Figure 1.**

Select one form of punctuation and use it consistently throughout your paper.

Visual items that appear in appendices should *not* feature a continuation of designations in the text. Appendices, themselves, should be designated by a letter (and they should also feature titles). Visual items in appendices should be designated with respect to appendix letters. Thus, Appendix A might feature **Figure A-1, Figure A-2, Figure A-3**, and so forth, and Appendix B might feature **Figure B-1, Figure B-2, Table B-1, and Table B-2**.

In the Body of the report, designations which accompany visual items should be rendered in 10-pt. bold font (but not in the List of Figures or the List of Tables).

Immediately following the designation of a visual item in the text, the caption should appear. The caption should be rendered in 10-pt. bold font; it should be a single sentence that concludes with a period or other suitable punctuation. Significant words should be capitalized. For example:

**Figure 1: Distribution of Velocity and Enthalpy in Similar Solutions.**

If additional explanatory sentences are required to supplement the caption, you may add them in non-bolded font. However, additional sentences are discouraged: try to write complete, single-sentence captions. Nonetheless, an example of a caption with additional information follows:

**Figure 1: Effect of Heating and Cooling the Boundary Layer on the Critical Reynolds Number.** Investigation carried out on a flat plate at zero incidence.

Captions should be unique. They should not repeat information found in the text, they should not provide unnecessary background information, and they should not simply reproduce a title of a visual item. Visual items, in fact, should not be titled.

The designation and its corresponding caption should be centered below a figure, but above a table. If a caption is longer than one sentence, it should be left-justified. A consistent amount of white space (two spaces) should appear below the visual item *before* the designation and caption. The same amount of white space should appear below the designation and caption, followed by the text (if any) of the document.

To repeat: figure captions shall be below the figures; table captions shall be above the tables.

Captions shall be punctuated in a grammatically correct manner.

### 1.1.7.5. Basic Rules in Using Figures and Tables

All visual items – that is, all figures and tables – should be neat, clear, clean, and legible. For text and numbers in a visual item, never use font that is less than 8-pt. in size. Do not mix sizes and styles of lettering and numbering. Center all visual items. Don't place items in the middle of a paragraph. Figures and tables should appear on the same page as their corresponding designations and captions. Two white spaces should appear above an item; two white spaces should appear below the item – in this case, “below the item” refers to the designation and its caption.

All figures and tables shall feature designations and captions.

For figures that feature parts that are referred to in the text, label the parts. For example, the caption of Figure 8 in a capstone report might be “Types of *Esox masquinongy*.” Within Figure 8, three types of *Esox masquinongy* might appear. Each type might be labeled “A,” “B,” and “C,” respectively. In the text, the writer would refer to “A” in Figure 8 if he or she wished to discuss the first type.

Whenever possible, visual items – particularly tables – should not span more than one page. If you cannot avoid spanning a table across multiple pages, you *must* repeat the column headings on subsequent pages for the convenience of the reader. Similarly, you must repeat the designation and caption – with a continuation note.

For example, part of a table may appear on page 5:

**Table 1: Density, viscosity, and Kinematic Viscosity of Water and Air in Terms of Temperature.**

The table may continue on to page 6. Thus:

**Table 1: Density, viscosity, and Kinematic Viscosity of Water and Air in Terms of Temperature (continued).**

If a table is too wide, no ideal solution exists for handling it. You might try to use landscape orientation. You may wish to reduce the font size and column spacing, but do not do this if the legibility is compromised. You may extend the table horizontally across two facing pages. In this case, proportion the table evenly between the pages, and align the rows. Finally, you might print the table on oversize paper and bind it as a foldout.

If color is required to understand a visual item, be sure to print the document in color.

### 1.1.7.6. Figure Axes

Figure axis labels are often a source of confusion. Try to use words rather than symbols. As an example, write the quantity "Magnetization" or "Magnetization, M," not just "M." Put units in parentheses. Do not label axes only with units. For example, write "Magnetization (A/m)" or "Magnetization (A x m<sup>-1</sup>)," not just "A/m." Do not label an axis with a ratio of quantities and units. For example, write "Temperature (K)," not "Temperature/K." Multipliers can be especially confusing. Write "Magnetization (kA/m)" or "Magnetization (103 A/m)." Do not write "Magnetization (A/m) x 1000" because the reader would not know whether a value of 15 on this axis meant 15000 A/m or 0.015 A/m.

### 1.1.8. Footnotes

Footnotes, if used in the Body of a capstone report or thesis, shall be numbered consecutively, independent of the reference numbers. Footnotes shall be numbered using superscripted numbers or special symbols (see Section 2.3). The actual footnote shall be placed at the bottom of the page in which it was cited. Do not put footnotes in the References section of the document.

As a general rule of thumb, use footnotes in the main text as explanatory notes (if required), not as tools to cite sources. To cite sources, use Reference numbers. Footnotes to document sources are required in the Nomenclature section, the Glossary, and the appendices.

### 1.1.9. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the Body of a capstone report or thesis, even if they have already been defined in the Nomenclature section. An acronym is defined as "MSOE" is in the following sentence. This style guide pertains to capstone reports and thesis documents generated by students at the Milwaukee School of Engineering (MSOE).

Abbreviations commonly understood by people in technical disciplines, such as ft, lb, ft-lb, g, kg, and rms, do not have to be defined. Try to avoid using abbreviations or acronyms in the title of the report unless they are very commonly used or are very difficult to avoid for some reason.

Because the capstone report and thesis are examples of formal documents, requiring a formal writing style, avoid the use of colloquial abbreviations and acronyms. Such abbreviations and acronyms may feature a common, "every-day" use, but can feature technical uses. For example, "vs." stands for "versus" in common parlance, but it can also stand for "volatile substance." Avoid confusion by simply writing out "versus." If "vs." is employed to mean "volatile substance" in a document, then define the abbreviation in the text and in the Glossary so that a reader is not confused. Do use an

ampersand (&) to signify “and” unless the ampersand is part of a proper name (for example, the name of a company might be “Schroeder & Sons, Ltd.”).

### **1.1.10. Equations**

The word “equations” is understood to mean equations, formulas, numbers, and other mathematical expressions. Equations, formulas, numbers, and mathematical expressions are frequently employed in capstone reports and thesis documents. Their use is governed by a number of rules.

#### **1.1.10.1. Numbering of Equations**

The general rule of thumb is that all equations should be numbered sequentially. This is a general recommendation, however, not a requirement. It may not be necessary, for example, to number an equation if it is the only equation in a document. Alternatively, a document may feature hundreds of equations. The numbering of many of these equations may not be necessary, and may serve only to clutter a page for a reader. Whether or not all, or most, or some, or merely a few of these equations need to be numbered depends on the answers to a series of questions. These questions include the following:

- (i) In addition to its appearance on the page where it occurs, is the equation or formula mentioned elsewhere in the text?
- (ii) Is the equation or formula a significant mathematical expression in the text?
- (iii) Is the equation a significant derivation, or part of a derivation?
- (iv) Is the equation or formula part of a calculation?
- (v) Is the formula an important chemical formula in the text?

Any equation that is referred to elsewhere within the text should be numbered. That is, for example, if an equation appears on page 5 of a capstone report, but is referred to on several other pages in the report, the equation must be numbered. An equation that is referred to only in the sentence just before or just after the equation appears does not need to be numbered, but can be – and should be if it is an important mathematical expression in the document.

An equation that is a significant mathematical expression in the text of the document must be numbered.

For the convenience of the reader, each equation that forms a step in a derivation must be numbered.

Simple calculations that are not part of a derivation do not need to be numbered, unless such numbering clarifies the steps of the calculation for the reader.

Equations that are numbered are to be numbered consecutively with equation numbers in parentheses flush with the right margin, as in (1). The equation may be either centered or left-justified, but all equations should be positioned in a consistent way. Thus:

$$d = 2ht \quad (1)$$

or

$$d = 2ht \quad (1)$$

Be sure that all equation numbers are consistently placed.

Be sure that the symbols in your equation have been defined before the equation appears or immediately following the equation.

#### 1.1.10.2. Referring to Equations

In the text of a capstone report or a thesis, when referring to an equation, write out the word “Equation” followed by the equation number. The word “Equation” must be capitalized.

For example, when discussing a substitution with respect to Equation (1) and Equation (2), write: “Substituting the value of  $h$  from Equation (1) in Equation (2), we obtain ... .”

If desired, you may simply refer to the equation number itself, if the reference to the equation is clear to the reader. Assuming that our reader clearly understands that we are discussing Equation (1) and Equation (2) in our example, we could write: “Substituting the value of  $h$  from (1) in (2), we obtain ... .”

Let clarity guide your decision regarding whether or not to refer to “Equation (1)” or simply to “(1).”

Do not start a sentence with an equation number only: you must use the word “Equation” to start the sentence. That is – for example -- do not write, “(1) demonstrates that elasticity is minimal.” Instead, write, “Equation (1) demonstrates that elasticity is minimal.”

When referring to equations, avoid sentence constructions that lead to double parentheses. For example, do not write, “Smith’s equation (see Equation (6)) can be employed to determine ... .” Instead, simply replace the outer parentheses with dashes in these types of constructions. Thus, “Smith’s equation – see Equation (6) – can be employed to determine ... .”

### 1.1.10.3. Punctuating Equations

Equations in a capstone report and in a thesis should be punctuated properly. As Rubens notes, "... the best mathematical writers depend on punctuation to add precision to their meaning, just as all writers do. Mathematical material, including displayed equations, should be punctuated according to the same rules used by any other writing" (see page 207 of Philip Rubens (General Editor), 1994, *Science and Technical Writing: A Manual of Style*, published by Henry Holt and Company in New York).

To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. If available, use a long dash rather than a hyphen for a minus sign. Use parentheses to avoid ambiguities in order of operations.

#### 1.1.10.3.1. Punctuation for Introducing Equations in the Text

Punctuation may or may not be required when introducing an equation in the text. Whether or not punctuation is required depends on how the equation is introduced. Introduce and explain all equations. Treat all equations as if they were parts of sentences – which, in fact, is how they should be handled.

It is not correct to merely place an equation after a complete sentence.

$$a + b = z \tag{1}$$

Nor is it grammatically correct to introduce each equation with a colon. This is particularly the case with a series of equations. For example:

---

We observe that the elasticity of the plate is given by:

$$(c + b) - x \tag{1}$$

and the flow of heat, H, by:

$$H = 278.7(ut). \tag{2}$$


---

In this case, the construction is literally ungrammatical.

Instead, introduce the equation as part of a grammatically-correct sentence. Such usage may or may not require punctuation. To achieve a grammatically-correct sentence, you may wish to substitute in your mind "two plus two" for the equation as you write. If the

clause “two plus two” has been rendered in a grammatically-correct manner in your sentence construction, it’s likely that substituting the actual equation will also lead to a correct sentence. For example, it is easily seen that the following construction is not correct.

---

We observe that the elasticity of the plate is given by: “two plus two” and the flow of heat, H, by: “two plus two.”

---

To correct the sentence, we need to eliminate the full colons. We may also wish to insert a comma before the conjunction “and.” Thus:

---

We observe that the elasticity of the plate is given by “two plus two,” and the flow of heat, H, by “two plus two.”

---

#### **1.1.10.3.2. Punctuation Following an Equation in the Text**

Punctuation may or may not be required following an equation in the text. Whether or not punctuation is required depends on whether or not the equation concludes a sentence, or is part of a sentence construction in which an in-sentence punctuation mark is required. Treat all equations as if they were parts of sentences – which, in fact, is how they should be handled.

#### **1.1.10.3.3. Punctuation and Defining Equation Variables and Symbols**

The variables and symbols in all equations must be clearly defined. Use a “where” list to state the definitions. The “where” list must be correctly punctuated. Thus:

---

The energy balance equation,

$$h_2 = Q_{1-2} + h_2 / m_{WF} , \quad (40)$$

was utilized to fully define the enthalpy at state (2),

where

$m_{WF}$  = mass flow rate of the working fluid,

$Q_{1-2}$  = heat transfer rate from the engine coolant to the working fluid,

$P_1$  = pressure of the working fluid at the outlet of the compressor,

$h_1$  = enthalpy of the working fluid at the outlet of the compressor,

and

$h_2$  = enthalpy of the working fluid at the outlet of heat exchanger 1.

---

For a small number of variables or symbols, a “where” list is not necessary. In this situation, simply write the “where” clause as part of the sentence containing the equation. Thus:

---

The energy balance equation,

$$h_2 = Q_{1-2} + h_1 / m_{WF} , \quad (40)$$

was utilized to fully define the enthalpy at state (2), where  $m_{WF}$  is the mass flow rate of the working fluid, and  $Q_{1-2}$  is the heat transfer rate from the engine coolant to the working fluid.

---

#### **1.1.10.3.4. Example of How to Punctuate Equations**

Use the following example to guide your handling of equations in capstone reports and in thesis documents.

We now propose to develop the approximate method of the preceding section so that it can be applied to the general problem of a two-dimensional boundary layer with pressure gradient.

The energy dissipation thickness  $\gamma$  and the enthalpy thickness  $\phi$  also satisfy a relation which follows from the energy equation in its form – see (15.10). On comparing (15.10) with (15.47), we obtain

$$a + b = c, \quad (15.60)$$

so that in view of (15.53) and (15.54), we have

$$c^2 = a^2 + b^2. \quad (15.61)$$

Introducing the velocity of sound  $p = q$  at state  $T_1$ , at the edge of the plate, we have

$$h = gT_1 = p \quad (15.62)$$

so that (15.57) becomes

$$x = z, \quad (15.63)$$

where  $z = u$  denotes the local Mach number at the outer edge of the boundary.

The second approximation is seen to contain a steady-state term which does not vanish at a large distance from the body. Its magnitude is given by

$$r = f - g, \quad (15.64)$$

where

$r = \text{something,}$   
 $f = \text{something else,}$   
 $g = \text{something else.}$

Using (15.40), we determine that

$$-r = f + g \quad (15.65)$$

and

$$1/r = -(f + g). \quad (15.66)$$

From BL-1A [6], we employ (15.39) to determine the stress  $\zeta$  of the layer. We see that

$$j = m + n, \quad (15.39)$$

and therefore,

$$5 = 3 + 2,$$

so that the stress  $\zeta$  equals 5 units.

#### 1.1.10.4. Derivations

A derivation is the process of combining fundamental equations to form new equations. For the convenience of the reader, the steps of all derivations in a capstone report and a thesis should be numbered. The first appearance of an equation requires an equation number that adheres to the sequence of numbering in the document, but thereafter, numbering may become “mixed” as previous equations are manipulated, substituted, and transformed.

##### 1.1.10.4.1. Example of a Derivation

The following derivation is a modified example from Merrill Rassweiler and J. Merle Harris, 1955, *Mathematics and Measurements* (Evanston, IL: Row, Peterson and Company), pp. 214-215.

---

Combine the formulas

$$P = hm/g \quad (1)$$

and

$$d = 2ht \quad (2)$$

so as to eliminate  $h$  and derive a new formula for  $t$ .

*First operation:* Neither of these formulas is a formula for  $h$ , so one of them must be solved for  $h$ . Sometimes one formula will be easier to solve than another, but in this example it does not matter which we choose. We shall solve for  $h$  in Equation (1):

$$P = hm/g, \quad (1)$$

$$(g/m)P = (hm/g)(g/m), \quad (3)$$

$$h = gP/m. \quad (4)$$

This means that  $gP/m$  is equivalent to  $h$  and may be used instead of  $h$  in the other equation.

*Second operation:* Substitute the value of  $h$  from Equation (4) in Equation (2). That is, substitute from

$$h = gP/m \quad (4)$$

into

$$d = 2ht \quad (2)$$

to obtain

$$d = 2gPt/m. \quad (5)$$

We now have only one equation and  $h$  has been eliminated.

*Third operation:* Solve Equation (5) for  $t$ . Thus,

$$d = 2gPt/m, \quad (5)$$

so

$$md = 2gPt \quad (6)$$

and

$$t = md/2gP, \quad (7)$$

which is the desired equation.

#### 1.1.10.5.Lengthy Equations

When an equation is longer than one line, start the first line at the left margin, end the last line near the right margin, and keep the intermediate lines centered. Equation (1) that follows demonstrates this procedure:

$$\begin{aligned} 23ax^{23} + 22bx^{22} + 21cx^{21} + 20dx^{20} + 19ex^{19} + 18fx^{18} \\ + 17gx^{17} + 16hx^{16} + 15ix^{15} + 14jx^{14} + 13kx^{13} \\ + 12lx^{12} + 11mx^{11} + 10nx^{10} + 9ox^9 + 8px^8 \\ + 7qx^7 + 6rx^6 + 5sx^5 + 4tx^4 + 3ux^3 + 2vx^2. \quad (1) \end{aligned}$$

#### 1.1.10.6. Calculations

In capstone reports and thesis work, it is often necessary for a writer to substitute specific values for variables in fundamental equations and in derivations, and then to carry out calculations with respect to the specific values. These specific values are associated with the investigation that the writer is describing in the document. A distinction exists, then,

between calculations on the one hand, and fundamental equations, mathematical expressions, and derivations on the other hand.

Calculations in a capstone report and a thesis may be handled by means of one of two methods.

One method is simply to place all calculations in an Appendix, or in more than one Appendix. This method is the preferred method. Calculations in an Appendix may be hand-written (although the hand-written document will need to be scanned into the final version of the capstone report or thesis). All calculations should be labeled; all calculations should be clear, neat, legible, and logically arranged. A reader should be able to understand what the calculation is, why it is being performed, and what it is associated with in the main text.

A second method for handling calculations is to integrate the calculations into the Body of capstone report or thesis. This method can be useful in cases where calculations are brief. Once again, all calculations should be labeled; all calculations should be clear, neat, legible, and logically arranged. A reader should be able to understand what the calculation is, why it is being performed, and what it is associated with in the main text.

#### 1.1.10.6.1. Example of a Calculation

Consider the quadratic formula, which states that if  $ax^2 + bx + c = 0$ , then

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}. \quad (1)$$

Solving for the specific quadratic equation of  $2x^2 + 5x - 3 = 0$ , we see that in Equation (1),  $a = 2$ ,  $b = 5$ , and  $c = -3$ . Therefore,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad (1)$$

$$x = \frac{-5 \pm \sqrt{(5)^2 - 4(2)(-3)}}{2(2)}$$

$$x = \frac{-5 \pm \sqrt{25 + 24}}{4}$$

$$x = \frac{-5 \pm \sqrt{49}}{4}$$

$$x = \frac{-5 \pm 7}{4}.$$

#### 1.1.10.7. Equations in an Appendix

Equations may be used in an Appendix of a capstone report or thesis. The same usage rules that apply to equations in the Body of the document also apply in an Appendix. However, if it is necessary to number equations in an Appendix, the numbering employed

should not be a continuation of the numbering of equations in the Body of the document. Instead, use a numbering system that incorporates the designation of the Appendix.

For example, equations in Appendix A might be numbered (A-1), (A-2), (A-3), and so forth. Equations in Appendix B might be numbered (B-1), (B-2), (B-3), and so forth.

#### 1.1.10.8. Documenting Equations

Equations that have been taken from another source must be documented. For derivations, the writer must document the fundamental equations employed in the derivation (assuming that the fundamental equations were taken from another source). See Chapter 2 for information on how to document sources.

Document equations in such a manner that the reader cannot confuse the reference number with the equation. For example, if a writer took Equation (2) from Reference [15], the equation must *not* be documented in the following manner:

$$d = 2ht \text{ [15]}. \quad (2)$$

Instead, document the equation by placing the reference number in an appropriate sentence before the appearance of the equation.

For example, Skimpole and Mowcher [15] developed the following equation, useful for determining the number of blood cells in a sample:

$$d = 2ht. \quad (2)$$

#### 1.1.10.9. Numbers

Express units of measurement, time, and quantity as numerals, but spell out one through nine when referring to days, months, and years. Thus:

- three days
- four months
- five years

Use numerals, however, when reporting time logs with respect to investigations. Thus:

- 7 hours 16 minutes 27 seconds

Always spell out a number at the beginning of a sentence. If a sentence begins with a number, and features additional numbers, spell out all of the numbers.

### 1.1.11. Punctuation, Usage, Grammar and Other Writing Issues

For help with writing issues, such as punctuation, usage, and grammar, consult *The Chicago Manual of Style* (2003), published by the University of Chicago Press.

Numerous helpful writing sites are also available on the Web. Two excellent sites are Purdue University's Online Writing Lab (OWL) at <http://owl.english.purdue.edu/>, and the Capital Community College Foundation's *Guide to Grammar and Writing* at <http://grammar.ccc.commnet.edu/grammar/>.

The capstone report and the thesis are examples of technical documents. The primary purpose of a technical document is to transmit technical information accurately. The term "technical" is here intended to encompass all subjects in the specialized areas of science and technology. A technical document is distinguished from other types of documents by a number of characteristics. For example, a technical document typically is based on factual data, and usually reports on data and results generated from an original investigation utilizing theoretical, experimental, or design-based methods.

The tone of a capstone report and a thesis should be objective, and the style should be formal, clear, concise, precise, and unambiguous. Content in a capstone report and a thesis typically is both detailed and useful to a targeted audience, and tends to feature a liberal use of visual material. Invariably, the structure of a capstone report and a thesis is logical, consistent, and clear.

Correct grammar, punctuation, usage, spelling, and mechanics all contribute to the clarity, precision, and professionalism that are expected in a graduate-level capstone report and thesis. Writers of capstone reports and thesis documents, as well as their advisors and committees, are responsible for ensuring that the documents contain no errors of grammar, punctuation, usage, spelling, and mechanics.

### 1.1.12. Units

Throughout the capstone report and thesis, use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as "3.5-inch disk drive." Another exception would apply in situations where English units (or some other units) are very commonly used in professional practice for the particular quantities being reported, such as in the use of "8.5 x 11 in (21.6 x 27.9 cm) paper." In the latter case, it is acceptable to use the non-SI or non-CGS units as primary units, but only if all data are also presented with SI or CGS units. Avoid combining SI and CGS units, such as currents in amperes and magnetic fields in oersteds. This situation can lead to confusion because equations may not balance dimensionally. If you must use mixed units, clearly state the units for each quantity in an equation.

### 1.1.13. Other Recommendations and Common Mistakes

#### 1.1.13.1. Some Common Mistakes

The word "data" is plural, not singular: "data are," not "data is."

The subscript for the permeability of free space is a zero, not a lowercase letter "o."

In American English, periods and commas are within quotation marks, like this "period."  
A parenthetical statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses, like this.)

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g."

A graph within a graph is an "inset," not an "insert."

The word "alternatively" is preferred to the word "alternately" (unless you really mean something that alternates).

Do not use the word "essentially" to mean "approximately" or "effectively."

Do not use the word "since" to mean "because" (as in "Since the numerator is always zero, . . .").

Be aware of the different meanings of homophones, and use them correctly. Common homophones include "affect" and "effect," "complement" and "compliment," "discreet" and "discrete," "principal" and "principle."

Do not confuse "imply" and "infer."

The prefix "non" is not a word; it should be joined to the word it modifies, usually without a hyphen, although a hyphen is sometimes required. Consult a dictionary to determine correct usage.

No period occurs after the "et" in the Latin abbreviation "*et al.*" See Section 1.1.13.2.

Use a zero before decimal points: "0.25," not ".25." Use "cm<sup>3</sup>," not "cc." Do not mix complete spellings and abbreviations of units: "Wb/m<sup>2</sup>" or "webers per square meter," not "webers/m<sup>2</sup>." Write out units when they appear in text: ". . . a few henries," not ". . . a few H."

Punctuation should appear inside quotation marks, not outside them.

When two or more words are used to modify a noun, then those words should be hyphenated, e.g., "cross-functional teams." Verify the use of hyphenated words by looking in the dictionary.

Avoid "there is," "there are," and "it is" sentence constructions. These phrases are examples of expletive constructions, which create unnecessary wordiness.

Avoid the use of vague modifiers ("very," and "extremely").

The capstone report and thesis are formal documents. They should be written in a formal style.

### **1.1.13.2. Use of Latin Abbreviations**

A small number of Latin abbreviations can be usefully employed in the capstone report and thesis. A writer can effectively save time and space by correctly employing these abbreviations. All Latin abbreviations must be italicized.

Abbreviation: *e.g.*

Definition: "*Exempli gratia*" (Latin); "for example," "such as"

Usage: Use this abbreviation in the text of your document to signal a list of examples.

Example: "Several commands exist for outputting text to a screen (*e.g.*, "puts," and "printf")."

Abbreviation: *i.e.*

Definition: *id est* (Latin); that is

Usage: Use this definition in the text of your document to indicate a clarification, or a definition of a preceding point.

Example: "It appears that the author here has simply produced a tautology (*i.e.*, any statement which is always true regardless of the truth values of the simple statements of which it is composed)."

Abbreviation: *sic*

Definition: "thus" or "so"

Usage: Use this abbreviation in the text and in references to show that an obvious error is an exact reproduction of the original.

Example: Burrell, David C. 1974. *Atomic Spectrometic (sic) Analysis of Heavy-Metal Pollutants in Water*. Ann Arbor: Ann Arbor Science Publishers.

In this citation, the writer informs the reader that "Spectrometic" is misspelled in the original document.

Abbreviation: *sub verbo*

Definition: "under the word"

Usage: Use with Reference entries for dictionaries.

Example: See "For a dictionary or similar reference" in the examples of how to cite references.

Abbreviation: *et al.*

Definition: Abbreviated form of the Latin expression, *et alii* ("and others").

Usage: Use this abbreviation in the text and in the References section and the Bibliography to refer to the secondary authors of a document. Since *al.* is an abbreviation, the period is always required.

Examples:

- (i) In the main text, a writer who wishes to refer to a document written by Skimpole, Podsnap, Mowcher, and Beedle, can write the following: "In the article by Skimpole *et al.*, a new theory of gravitation is presented."
- (ii) In the References section, the article in (i) might be cited as follows: Skimpole, Harvey *et al.* June 2006. "What Goes Up Must Come Down: A New Theory of Gravitation." *Journal of Gravitation* Vol. 56(6), pp. 34-121.
- (iii) A period does not appear after *et*, and *et* should not be preceded by a comma. The use of *et al.* creates a plural subject; therefore, a plural verb should be employed. Thus: "Skimpole *et al.* write ...," not "Skimpole *et al.* writes ... ."

## Chapter 2.

### The Documentation of Sources

*Documentation* in a capstone report and a thesis broadly refers to that part of the document devoted to a systematic arrangement and acknowledgment of sources used by the student to produce the document. Specifically, documentation in a capstone report and a thesis denotes the use of reference numbers within the main text that point to a corresponding numbered list of information sources in a section entitled References. This list of References is placed immediately after the main text of the document, and features full bibliographic citations for all source material.

#### 2.1. Reference Numbers

A *reference number* is a number, enclosed in brackets, that appears in the main text of a capstone report and thesis. The reference number indicates that a source is being cited.

#### 2.2. References Section of a Capstone Report and a Thesis

The References section of a capstone report and a thesis is a compilation of all of the sources cited in the main text by means of reference numbers. Sources are numbered sequentially, and are arranged by order of appearance in the main text of the document. References – also referred to as bibliographic citations -- for the sources should be accurate and complete. Sources in the References section are known as *reference entries*.

For example, the appearance of [1] in the main text of a capstone report and a thesis indicates that a source is being cited. In this case, since it is the first time a source is being cited, the source is assigned the same reference number in the References section, and also appears as the first source listed, or rather, the first reference entry. The appearance of the reference number [1] in the main text thus refers the reader to the References section, where the first reference entry (or source) to appear is the first to be cited, and is indicated as such with reference number [1].

#### 2.3. Why Documentation Is Necessary

Documentation in a capstone report and a thesis is essential for two major reasons.

- [1] By means of reference numbers and reference entries in the References section of the document, the student acknowledges and identifies all the works of other people used to produce the capstone report or thesis. All sources need to be identified. Such attribution is particularly important in the event that questions are raised about plagiarism.
- [2] Documentation is essential because it provides the reader with an opportunity to assess and to verify the accuracy and the authority of any statements, assertions, ideas, or concepts that appear in a document.

## 2.4. When to Document

Documentation, which identifies the source of material, is required in four general situations:

- [1] When you use direct quotations, even excerpts, from another source;
- [2] When you use a paraphrased presentation of original or unique ideas (*i.e.*, indirect quotations) from another source;
- [3] When you use quantifiable data (facts, data and statistics) extracted from the works of others;
- [4] When you use visual material extracted from the works of others. This includes both the content and design of the visual material.

Documentation is required in an additional six specific situations:

- [5] When you use a fact that is not well known, even within a discipline;
- [6] When you use an argument or information that is contradictory to facts or suppositions;
- [7] When you use a fact that is obscure or difficult for the reader to verify;
- [8] When you use specific pieces of information that bear directly upon important points or arguments;
- [9] When you use facts brought in from other disciplines;
- [10] When you use any opinions and ideas not your own.

## 2.5. How to Format and Document Quotations

Quotations in a capstone report and a thesis are of two types: indirect (paraphrased or summarized) and direct (verbatim). You must document both types. That is, you must name the sources of indirect and direct quotations.

You should document in your capstone report and thesis any fact or opinion that you obtain from one of your sources, whether you first discovered the idea there or you have assimilated it so thoroughly that it seems to be your own. Some exceptions to the rule are facts that are common knowledge (for example, that velocity is the time-rate-of-change of position), facts that can be verified easily and do not differ from one source to another (for example, that the limit of  $(\sin x)/x$  as  $x$  approaches zero is one), and well-known

sayings or proverbs (for example, that Isaac Newton stated, "Every body persists in its state of rest or of uniform motion in a straight line unless it is compelled to change that state by forces impressed on it").

Acknowledgment of credit through documentation does not diminish the originality of your work. Particularly in a capstone report or a thesis reporting on an original investigation, your contribution obviously and primarily consists of your own original work, but it also consists of imposing your own order on the sources cited and on drawing an original conclusion from them. Documentation allows your reader to see the sources you used to help you reach your conclusions, to check the interpretations of your sources, to place your work in the tradition of inquiry, and to locate further information on your topic.

### **2.5.1. How to Document a Direct Quotation**

A direct quotation presents verbatim material from another source. It is appropriate to use a direct quotation when you need to provide an authority, preserve the integrity of the source author's original wording, or ensure the accuracy of your borrowing from the source.

Direct quotations must feature attribution. Attribution informs the reader that these are not your ideas and gives credit to the source of the quotation. While providing the complete name of your source is the commonly acceptable practice, you may use other types of identification, such as "researchers," or "one author."

#### *Incorrect Source Attribution*

"The open subsystem model predicts that cache-awareness increases the average response time by 17 percent for a trace scaling factor of one. This unexpected result is caused by interactions between complex performance/workload feedback effects, which remain largely intact in this case, and the disk's prefetching behavior." [1]

#### *Correct Source Attribution*

According to Dr. Gregory Ganger of Carnegie Mellon University: "The open subsystem model predicts that cache-awareness increases the average response time by 17 percent for a trace scaling factor of one. This unexpected result is caused by interactions between complex performance/workload feedback effects, which remain largely intact in this case, and the disk's prefetching behavior." [1]

### 2.5.1.1. Lengthy Direct Quotations

When you have a direct quotation that exceeds one sentence in length, you should use a block quotation format. Note that the quotation is indented from both sides, single-spaced, and rendered in 10-point font size. Quotation marks are not used, unless they occur within the direct quotation. An example of a lengthy direct quotation follows.

---

George Polites offers several definitions of a group and then demonstrates their equivalence. In his *An Introduction to the Theory of Groups*, his fourth definition is particularly noteworthy. He writes:

Let  $G$  be a group and  $a$  belong to  $G$ . We define  $a^1 = a$ ,  $a^2 = aa$ , and, in general, if  $k$  is a positive integer such that  $a^k$  has been defined, we define  $a^{k+1} = a^k a$ . We define  $a^0 = e$  and  $a^{-k} = (a^{-1})^k$ . Note: Since  $e = e^k = (aa^{-1})^k = ak(a^{-1})^k$ , ( $a$  and  $a^{-1}$  commute), we see that  $(a^{-1})^k$  is the inverse of  $a^k$ . Thus  $(a^k)^{-1} = (a^{-1})^k = a^{-k}$ . The reader should verify that  $a^{mn} = a^{m+n}$  and  $(a^m)^n = a^{mn}$  hold in a group [1].

### 2.5.2. Indirect Quotation

The words *paraphrase* and *summary* are sometimes used as synonyms, but a paraphrase can be differentiated from a summary based on length. A paraphrase restates the original source in approximately the same number of words. A summary condenses the original. When you paraphrase or summarize, you should use your own words and sentence structure. If you find that you cannot avoid using a phrase from the original, place the words in quotation marks. Paraphrases and summaries should represent the original source accurately and completely, avoiding distortion through imprecise or mistaken restatement, altered emphasis, or significant omissions.

Even when you have restated a passage completely in your own words, you must indicate that you encountered the information in your reading or from some other resource. In some cases you may wish to attribute the statement in your text by citing the author and, if necessary or desirable, the title of the work. Even if you choose not to name the author in your text, you must document the source of the idea in the References section, and correctly refer to it with a reference number appropriately positioned in your text.

## 2.6. Mechanics of Using Reference Numbers and a References Section

Each reference number that appears in the main text should be enclosed in brackets. The reference number should precede all punctuation marks, with the exception of a sentence that ends in a period and quotation marks. In this case, the reference number follows the quotation marks. For example: The student said "I do not understand." [1] Without quotation marks, a sentence would otherwise be cited in the following manner: The student does not understand [1].

Reference numbers shall be used only in the Body of a capstone report and thesis. For documenting material in the Nomenclature section, the Glossary, and the Appendices, see the Nomenclature, Glossary and Appendices descriptions above.

The first reference number that appears in the body of a report shall be reference number [1]. References shall be numbered sequentially thereafter by order of appearance.

Each reference number must be associated with a single, unique source, which should appear as the same numbered reference entry in the References section.

Although each reference number is associated with a single source, multiple reference numbers may be employed for citation purposes at the end of a sentence. Multiple occurrences should be separated by commas. Therefore, a multiple reference is similar to a matrix. An example of a multiple reference follows: [1, 3, 4, 5]. This multiple reference cites four references, including Reference [1], Reference [3], Reference [4], and Reference [5].

Each reference entry in the References section must be rendered as a full, complete, and accurate bibliographic citation. That is, each reference should feature information such as the name of an author or authors, the name of a creator or creators, a date, a title, publication information (if available), and other relevant information.

Only those references cited in the Body of the document should appear in the References section.

All reference numbers can point only to reference entries in the References section. Reference entries cannot feature explanations, commentary, or elaboration of the main text. If you wish to elaborate or comment on something in your main text, you should employ a footnote using either a superscripted number (as in, "Faraday stated<sup>1</sup> that ...") or an asterisk (as in, "Faraday stated\* that ...") to mark the text you wish to comment on. Place your comment, similarly marked by a superscripted number or an asterisk (\*), at the bottom of the page of text. For a second comment or elaboration appearing on the same page, use a superscripted "2" or use the pound sign (#).

Since an important purpose of using references is to allow the reader to verify the authority, accuracy, and reliability of statements and assertions made in your capstone report or thesis, it is crucial that each reference number features a corresponding, single, and unique reference entry in the References section that is accurate, reliable, unambiguous, correct, and complete. An interested reader should be able to use the bibliographic information in the reference entry to quickly and efficiently locate a copy of the work cited. The reference entry should also clearly indicate the type of source that is cited if any confusion exists on the matter.

In the References section, the reference number appears farthest to the left margin. After indenting, the reference entry then appears. If the reference entry features more than one line of text, all subsequent lines must be aligned with the first line.

Because documentation is employed, in part, as a tool useful for verifying the accuracy, authenticity, and quality of a capstone report and thesis, it is crucial that all works appearing in the References section should be available for examination by others. Accordingly, in all cases, complete documentation is mandatory; in some cases, however, in addition to adequate documentation of a cited resource, a student is also advised to retain in his or her possession an actual hard copy of a work, particularly one which may be of an ephemeral nature, and which furthermore may not be available through a library (e.g., Internet resources, such as Internet web pages, are good candidates for this procedure).

In every case where the writer wishes to indicate that a copy of a work is in his or her possession, one of the following phrases should be employed at the end of a Reference entry:

"Available from the author." (without quotation marks), or "A copy of this article is available from the author." (again, without quotation marks).

The author in this case refers to the student, who is the author of the capstone report or thesis. The phrases are typically used only in cases of obscure references and references which are difficult to obtain.

The following examples demonstrate various situations that may arise when reference numbers with corresponding reference entries are employed. Notice that the examples are excerpts from the main text of documents, and that each of the excerpts features reference numbers.

*Excerpts from the main text of a capstone report or thesis*

Returning now to our discussion of fields, it is clear that if  $K$  is an extension field of  $F$ , then we may regard  $K$  as a vector space over  $F$ . By the degree of  $K$  over  $F$ , we shall mean the dimension of  $K$  as a vector space over the field  $F$ . We denote the degree of  $K$  over  $F$  by  $[K:F]$ . If  $[K:F]$  is finite [1] -- that is, if  $K$  has a basis with a finite number of elements -- then we call  $K$  a finite extension of  $F$ .

The parameter found to have the most significant effect on the surface was flow [2]. Altering the flow produced several changes in the corrosion layer morphology. The first evident change was seen between coupons exposed to full pipe flow and those exposed to slug flow.  $FeCO_3$  crystals were observed only on coupons exposed to full pipe flow.

The redundancy necessary for the ABFT method is commonly defined by real number codes, generally of the block type [3, 4, 5]. In almost all previous ABFT applications, correction of detected faulty output data is never considered because of the additional

complexity [4]; the exception to this are the series of projects associated with Draper Laboratories employing digital signal processing, where correction methods were investigated extensively [6].

In an interview conducted for this project, Ron House stated that "by far, the most common errors ... seen in C programs are the unterminated comment or incorrectly placed comments." [7] In his book, *Beginning With C: An Introduction to Professional Programming*, House offers an example of poorly placed comments [8]:

```
#include <stdio.h>

main() {

printf("/* starts a C comment\n");

printf("and */ ends it.\n");

/* printf("Everything in comments is ignored\n"); */

}
```

#### *How the Excerpts Are Documented in the References Section*

- [1] Polites, George W. 1968. *An Introduction To The Theory of Groups*. Scranton, Pennsylvania: International Textbook Company.
- [2] Heuer, J.K. and J.F. Stubbins. July 1998. "Microstructure Analysis of Coupons Exposed to Carbon Dioxide Corrosion in Multiphase Flow," *The Journal of Science and Engineering Corrosion* Vol. 54 (7), pp. 566-575.
- [3] Digital Equipment Corporation. August 1994. *DEC OSF/I System Administration*. Maynard, Massachusetts: Digital Equipment Corporation.
- [4] Wong, C.K. 1983. *Algorithmic Studies In Mass Storage Systems*. Rockville, Maryland: Computer Science Press, Inc.
- [5] Redinbo, G. Robert. June 1998. "Generalized Algorithm-Based Fault Tolerance: Error Correction via Kalman Estimation," *IEEE Transactions on Computers* Vol. 47 (6), pp. 639-655, [Internet, WWW, Database], *Available*: Available from the IEEE Xplore Database; ADDRESS: <http://ieeexplore.ieee.org/Xplore/dynhome.jsp>, [Accessed; 22 August 2007].
- [6] Leigh, William E. and Dia L. Ali. 1988. *System Architecture: Software and Hardware Concepts*. Cincinnati: South-Western Publishing Co.

- [7] House, Ron. 25 February 1998. Conversation with the author, Milwaukee, WI.
- [8] House, Ron. 1994. *Beginning With C: An Introduction to Professional Programming*. South Melbourne Victoria Australia: ITP Thomas Nelson.

## 2.7. Principles of Documentation

The first goal of documentation in a capstone report and a thesis is to *clearly and accurately identify and acknowledge* all of the sources employed in the writing of a document. In other words, if you've documented properly, a reader ought to be able to answer the following question: What sources did this author use? It is your responsibility as a writer to make this identification as clear and as easy as possible for your reader to understand. Your reader should not have to guess. Your reader should be able to use your documentation of a source to acquire a copy of the source (if it is available).

The second goal follows from the first: Your clear and accurate documentation should be deployed in a manner that enables your reader – if so inclined -- to quickly *assess and verify* the validity of content in a document that you write, *and* to quickly distinguish in your document the content that was derived from another source and the content that you contribute. To express the situation in another way, your reader ought to be able to read your document and to answer the following question: Are statements, facts, assertions, observations, ideas, concepts *substantiated* by credible sources, or are these things that you contributed after logically developing their introduction in the text? When you create documentation, in every case – with the exception of explanatory footnotes – it should satisfy these two fundamental goals.

### 2.7.1. Basic Documentation Elements

When you use a source in the writing of your capstone report or thesis, try to determine the answers to the following questions about the source.

- (i) Who or what wrote or created the source? Was it a single author? Was it two or more authors? Was it an editor? Was it a corporate author (*i.e.*, an organization, a business, some other entity)?
- (ii) What is the date of the source? When was it published? When was it revised? Does a date appear somewhere in the source? If you are using a website, does a date appear on the page, or in previous pages? Can you view the source of the page in order to determine a date?
- (iii) What is the title of the source? Does it feature an actual title? What is the complete title, including any secondary titles?

- (iv) What is the source? Is it a print source, or an electronic source? If it features no title, how would you describe what the source is?
- (v) Does any type of publication information exist? Can you identify a publisher? A place of publication? A location for a corporate author?
- (vi) What additional information in the source will help my reader to track down a copy of the source?

### 2.7.1.1. The Basics of Documenting a Book

The following information should be included, where applicable, in the reference entry for a book. The order in which this information is listed is the order in which it should appear. Variations in content and order may be necessary for certain types of books. The information used should be obtained from the title and copyright pages of the book.

#### *Author*

Full name of the author or authors; full name of the editor or editors if no single author(s) listed (editor's name may be given after title); or name of organization responsible for the writing of the book. (In the event that no author, editor, or institution is listed as the author of the work, then the title of the work is the first element in the footnote and bibliography.)

#### *Date of publication*

This should be the most recent copyright date.

#### *Title*

Full title of the book, including any subtitles. Book titles appear in italic.

*Editor, compiler, or translator, if any, and if in addition to listed author* (may be located in author's position if no author listed).

#### *Edition*

If appropriate.

#### *Volumes*

Total number if multivolume work is referred to as a whole.

#### *Volume number of a multivolume work.*

If single volume cited.

#### *Title of individual volume.*

If applicable.

#### *Series title.*

If applicable.

#### *Facts of publication: city and publisher.*

When multiple cities are listed on the title page, use the first city listed. For well-recognized cities, such as Chicago and New York, the state is not required. However, for cities not as well known or where several cities may have the same name, such as Greenville, South Carolina, the state should be included.

*Page number(s)*

In the footnote, you must provide the specific page or pages on which the material cited can be found.

Following is a sample of a reference entry for a book.

Tate, Curtis E., Jr., Leon C. Megginson, Charles R. Scott, Jr., and Lyle R. Trueblood. 1975. *Successful Small Business*. Dallas, TX: Business Publications, Inc.

**2.7.1.2. The Basics of Documenting an Article**

The order of the elements for an article is similar to that of a book.

*Author or Authors*

This is similar to the information for a book. Again, in the event no author is listed, the title of the article appears first.

*Date**Title*

The title uses regular title capitalization and is enclosed in quotation marks.

*Name of Serial Containing Article*

If available, include the name of periodical or serial. This name should be rendered in italics.

*Issue information*

This could include volume and issue number.

*Page reference*

This information should include the range of pages of the article.

Following are sample footnote and bibliography entries for articles.

Blau, Gary. December 1994. "Developing and Testing a Taxonomy of Lateness Behavior." *Journal of Applied Psychology* Vol. 79 (6), pp. 959-970.

The following shows the format to use when an author is not listed.

"Database Marketing Demystified." June 1993. *Target Marketing*, p. 13-16+.

**2.7.1.3. The Basics of Documenting an Electronic Resource**

Tremendous variety exists in the types of electronic resources that may be cited. A web page, a journal article published in a print journal but also available through a full text database, computer software, and e-books are all examples of electronic resources. When citing an electronic resource, it is necessary, first, to describe bibliographically the resource. After the resource has been adequately described, it is imperative to indicate that the item is an electronic resource and then to provide accurate details on how to

obtain the item. To reiterate briefly the principles and purposes of good documentation, it is crucial that a reader is able to use documentation to locate and obtain a copy of the item that is cited. This applies equally to print and to electronic resources. For example, it is virtually useless to cite a unique document obtained over the Internet without providing details on how a reader can also quickly and efficiently obtain a copy of the document.

When providing details on how to obtain electronic resources, it is extremely important to be accurate in the syntax, including punctuation and capitalization. For example, the success in obtaining a copy of a documented can be easily frustrated because all upper case commands were used with a remote server that happens to run a case-sensitive operating system.

In a reference entry that cites a traditional print information source, but that was obtained electronically, describe the item using the guidelines detailed above; then, in brackets, indicate that the item is an electronic resource, and describe briefly the electronic format; following this electronic resource designation is the word *Available*: in italics, and relevant details on how to obtain the item or where it is. Along with the *Available* statement, and separated by a semicolon, it may also be necessary to include an electronic address or path, which is indicated by an upper case ADDRESS:, or DIRECTORY PATH:, or SEARCH PATH:, or some other suitable designation. Finally, in brackets, indicate the date accessed [Accessed: <date>] if the document was obtained from an online resource, such as a website, ftp site, or database. In a reference entry, all major elements are separated by periods.

The order of elements for an electronic resource may include some or many of the elements listed above in “The Basics of Documenting a Book,” and “The Basics of Documenting an Article,” followed by:

Electronic resource designation: In brackets, a brief designation and – if appropriate – a format statement. The designation is required, but a format statement may not be necessary. For example: [Internet, WWW] indicates an electronic resource obtained via the Web on the Internet.

The *Available* and ADDRESS (or SEARCH PATH, etc.) element: *Available*: is a brief description of availability; ADDRESS: an electronic address. A semicolon is employed to separate the two parts. Either the *Available* part or the ADDRESS part should appear, although in most cases, both elements should be employed. For example: *Available*: Milwaukee School of Engineering website; ADDRESS: <http://www.msOE.edu>.

An access date statement: In brackets and in a day-month-year format, the date on which you accessed the resource. This element ends with a period. The access date is required for *all online* sources. For example: [Accessed: 31 July 2007].

A copy statement: If appropriate, a statement that indicates the student has a copy of the resource available for consultation by interested.

Samples of electronic resources include the following.

Palisade Corporation. 2000. @RISK (Version 4.05). [Internet, WWW, Computer program]. *Available:* Palisade Corporation, 31 Decker Road, Newfield, New York 14867; ADDRESS: <http://www.palisade.com/downloads/trials/risk4protrial.html>. [Accessed: 14 July 2007].

Ferid, Muhammad. June 2001. "B2B E-Commerce: Value Chain Transformation, Enablers, and Barriers, Technology, Privacy and Security." Master's thesis, The Massachusetts Institute of Technology. [Internet, WWW]. *Available:* Digital Library of MIT Theses; ADDRESS: <http://theses.mit.edu/>. [Accessed: 6 June 2007]. A copy of this thesis is in the student's possession and may be consulted by contacting the student at [smithj@msoe.edu](mailto:smithj@msoe.edu).

Wisner, Joel D. 2003. "A Structural Equation Model of Supply Chain Management Strategies and Firm Performance." *Journal of Business Logistics* Vol. 24(1), pp. 1-26. [Internet, WWW, Database]. *Available:* ABI/Inform Full-Text Database from ProQuest Information and Learning; ADDRESS: <http://www.proquest.com>. [Accessed: 9 August 2003]. A copy of this article is in the student's possession and may be consulted by contacting the student at [smithj@msoe.edu](mailto:smithj@msoe.edu).

### 2.7.2. General Format Rules for References

- (i) The basic format of a reference is a reference number in brackets, followed by a space, followed by the reference information. If the reference information requires more than one line, the reference must be aligned in a block.
- (ii) All reference entries should end in a period.
- (iii) Italicize the titles of all journals and all books.
- (iv) For references of *articles* from journals and magazines, the general format rules are as follows:

*With one personal author.*

Last name of author, first name of author. Date. "Title of Article." *Title of Journal or Magazine* Volume Number(Issue Number), pp. <page numbers>.

*With two personal authors.*

Last name of author, first name of author and First name of author followed by last name. Date. "Title of Article." *Title of Journal or Magazine* Volume Number(Issue Number), pp. <page numbers>.

*With three or more personal authors.*

Last name of author, first name of author, First name of author followed by last name and First name of author followed by last name. Date. “Title of Article.” *Title of Journal or Magazine* Volume Number(Issue Number), pp. <page numbers>.

*With a “corporate” author (i.e., an organization is the official author).*

Name of corporate author. Date. “Title of Article.” *Title of Journal or Magazine* Volume Number(Issue Number), pp. <page numbers>.

- (v) For references of *books*, the general format rules are as follows:

*With one personal author.*

Last name, First name. Date. *Title of Book*. Place of publication: Publisher.

*With two personal authors.*

Last name of author, first name of author and First name of author followed by last name. Date. *Title of Book*. Place of publication: Publisher.

*With three or more personal authors.*

Last name of author, first name of author, First name of author followed by last name and First name of author followed by last name. Date. *Title of Book*. Place of publication: Publisher.

- (vi) For references of *web pages*, the general format rules are as follows:

Author’s name (either personal author or corporate author – follow guidelines above). Date. “Title of web page.” [Internet, WWW]. *Address*: <URL goes here>; [Accessed: day-month-year]. A copy of this document is available from the author.

- (vii) For references of *articles* from *conferences or proceedings*, the general format rules are as follows:

Author’s name (either personal author or corporate author – follow guidelines above). “Title of Article.” In Name of proceedings or conference. Date of proceedings or conference. *Exact title of proceedings or conference*. Place of publication: publisher, pp. <page numbers>.

(viii) Reference entries need to feature complete bibliographic information.

**Appendix A.**  
**Examples of References**

The following examples represent the most common documentation situations encountered by students. In each instance, a sentence with a reference number appears first, followed by its corresponding reference entry in the References section of the technical document.

---

## **Abstract**

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Some databases provide abstracts of written works. A student may use the abstract of a document, without consulting the actual document itself, if it contributes to the student's research efforts. In most cases, it is best to consult the original document, but it may not always be possible. It is acceptable, then, to employ a well-written abstract of the article. If an abstract is used, then the abstract must be clearly cited as the source of information - not the original document.

### *In the main text*

Increasingly, engineers are becoming important members of front-line disaster-recovery teams sent into sites immediately following the occurrence of a natural or man-made disaster [1].

### *In the References section*

- [1] Abstract. Compendex database. Lowe, Mendi C. January 1993. "Is It Ethical to Profit From a Natural or Man-Made Disaster?" *Civil Engineering* Vol. 63(1), pp. 75-76.

---

## Articles

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---

## Academic Journals

---

### *In the main text*

Transition from state  $i$  to state  $(i + 1)$  occurs when the next checkpoint is taken without any failure after entering state  $i$ . In the absence of failures,  $T + C_i$  units of time is spent in state  $i$  before entering state  $i + 1$ . Thus, weight  $W_i(i+1)$  of this transition is equal to  $T + C_i$ . Also,  $P_i(i+1)$  equals the probability that no failure occurs during  $T + C_i$  units of execution and that the failure is a transient processor failure [1].

### *In the References section*

- [1] Vaidya, Nitin H. June 1998. "A Case for Two-Level Recovery Schemes." *IEEE Transactions on Computers* Vol. 47 (6), pp. 656-667.

---

## Popular Magazines

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### *In the main text*

The long-term future of electronics may lie within the realm of mechanics--quantum mechanics. So-called quantum computers lie somewhere between theory and reality. There are no such machines today, and most experts think it will be decades before one is practical. But they are considered a mathematically provable possibility [1].

### *In the References section*

- [1] O'Malley, Chris. March 1998. "Computing's Outer Limits." *Popular Science* Vol. 252 (3), pp. 64-69.

---

## Trade or Special Journals

---

### *In the main text*

The initial stage of image analysis usually consists of two steps -- thresholding and segmentation [1].

### *In the References section*

- [1] Kamensky, Lee. July 1998. "Image Segmentation for Image Recognition." *Dr. Dobb's Journal* Vol. 23 (7), pp. 115-118.

---

## Article Without an Author

---

At times, an article will not credit an author. In these cases, use the article's title, followed by the date, as the key element in the citation.

### *In the main text*

With the immense amount of personal information in digitized form now readily available to businesses -- for a fee -- the tremendous growth in database marketing is inevitable [1].

### *In the References section*

- [1] "Database Marketing Demystified." June 1993. *Target Marketing* Vol. 12 (4), pp. 13-16.

---

## Papers from Conferences, Proceedings, Workshops, Symposia

---

### *In the main text*

The nonlinear-transformation technique of Shanks can be usefully employed to improve perturbation solutions (regular or singular) of four fluid mechanical problems including high and low Prandtl-number free convection, longitudinal flow over a circular cylinder, unsteady flow of power-law fluids, and small Peclet-number forced convection from a sphere [1].

Sir Thomas Havelock appears to have been the first researcher to have introduced to ship theory the concept of a free wave system associated with a ship in steady motion [2].

### *In the References section*

- [1] Chien, Kuei-Yuan. "Application of Nonlinear-Transformation Technique to Perturbation Solutions in Fluid Mechanics." In *Midwestern Mechanics Conference*. 24-26 March 1975. *Developments In Mechanics. Proceedings of the 14th Midwestern Mechanics Conference*. Vol. 8. Norman, Oklahoma: University of Oklahoma Press, pp. 483-495.
  
- [2] Eggers, K. "On Free Waves." In *Office of Naval Research, National Science Foundation, and The University of Michigan*. 19-23 August 1963. *Proceedings of the International Seminar on Theoretical Wave-Resistance*. Vol. 1. Ann Arbor, Michigan: University of Michigan, pp. 191-196.

---

## Books

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### Book by a Single Author

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*In the main text*

We have seen that the equations of parabolas, ellipses, and hyperbolas are special cases of the general equation of the second degree:

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0,$$

where A, B, and C are not all zero [1].

*In the References section*

- [1] Dribin, Daniel M. 1969. *Elements of Pre-Calculus Mathematics*. Reading Massachusetts: Addison-Wesley Publishing Company.

---

## Book by Two Authors

---

*In the main text*

The equations of physics describe the relations between physical quantities. When these equations are linear and the quantities are scalars, the relation of, say, proportionality between  $x$  and  $y$  is indicated simply by the equation

$$y = ax$$

where  $a$  is the proportionality factor [1].

*In the References section*

- [1] Feldmann, Michel and Jeannine Henaff. 1989. *Surface Acoustic Waves for Signal Processing*. Boston and London: Artech House.

---

## Book by More Than Two Authors

---

*In the main text*

Several dangers are glossed over in this discussion. In flat spacetime one often does not bother to say where a vector, 1-form, or tensor is located. One freely moves geometric objects from event to event without even thinking. Of course, the unwritten rule of transport is: hold all lengths and directions fixed while moving; i.e., hold all Lorentz-frame components fixed; i.e., "parallel-transport" the object [1].

*In the References section:*

- [1] Misner, Charles W., Kip S. Thorne, and John Archibald Wheeler. 1973. *Gravitation*. San Francisco: W.H. Freeman and Company.

---

## Subsequent Edition of a Book

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### *In the main text*

A mask is a constant or variable that is used to extract desired bits from another variable or expression. Because the int constant 1 has the bit representation

```
00000000 00000000 00000000 00000001
```

it can be used to determine the low-order bit of an int expression [1].

### *In the References section*

- [1] Kelley, Al and Ira Pohl. 1995. *A Book On C*. 3rd. ed. Redwood City, California: The Benjamin Cummings Publishing Company, Inc.

---

## Book Chapter or Other Titled Part

---

### *In the main text*

According to the Nobel Prize-winning physicist, Eugene Wigner, "there are two basic concepts in quantum mechanics: states and observables." [1]

### *In the References section*

- [1] Wigner, Eugene P. "The Unreasonable Effectiveness of Mathematics in the Natural Sciences." In Jefferson Hane Weaver (ed.). 1987. *The World of Physics: A Small Library of the Literature of Physics from Antiquity to the Present*. New York: Simon and Schuster, pp. 80-96.

---

## Book With No Author

---

*In the main text*

Alkylbenzenesulphonates combine with methylene blue to form a complex which is soluble in chloroform [1].

*In the References section*

- [1] *Colorimetric Chemical Analytical Methods*. 7th ed. 1967. Salisbury, England: The Tintometer Ltd.

---

## Book With an Editor and No Author

---

*In the main text*

When an organic compound containing phosphorous is oxidized, the phosphorous is converted to phosphorous pentoxide, which dissolves in water to yield phosphate ions [1].

*In the References section*

- [1] Welcher, Frank J., Ph.D. ed. 1963. *Standard Methods of Chemical Analysis*. Sixth ed. Vol. II, Part A: Industrial and Natural Products and Noninstrumental Methods. Princeton, New Jersey: D. Van Nostrand Company, Inc.

---

## Book -- Electronic Book

---

### *In the main text*

Development organizations employ a variety of methodologies, including Capability Maturity Modeling (CMM), ISO 9000, Extreme Programming (XP), and Six Sigma [1].

A cascade blade profile can be considered as a curved camber line upon which a profile thickness distribution is symmetrically superimposed [2].

One of the essential features of a distributed remote sensing (DRS) system is a sensor field involving a number of fixed and moving nodes [3].

### *In the References section*

- [1] Jeff Zhuk. 2004. *Integration-Ready Architecture and Design: Software Engineering With XML, Java, .NET, Wireless, Speech and Knowledge Technologies*. Cambridge: Cambridge University Press. [Internet, WWW, E-book]. *Available:* Available from the Books24x7 ITPro Database; *Address:* <http://www.books24x7.com>; [Accessed: 24 August 2007].
- [2] S. L. Dixon. 1998. *Fluid Mechanics and Thermodynamics of Turbomachinery*. 4<sup>th</sup> ed. Elsevier. [Internet, WWW, E-book]. *Available:* Available from knovel Scientific and Engineering References Database; *Address:* <http://www.knovel.com>; [Accessed: 24 August 2007].
- [3] Committee on Distributed Remote Sensing for Naval Undersea Warfare. National Research Council. 2007. *Distributed Remote Sensing for Naval Undersea Warfare*. Washington, D.C.: The National Academies Press. [Internet, WWW, E-book]. *Available:* Available from The National Academies Press website; *Address:* <http://books.nap.edu>; [Accessed: 24 August 2007].

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## Class Notes

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### *In the main text*

It remains to be investigated whether any other memory models with a moderate number of control states can perform the retrieval and updating operations and still keep the data tree in some kind of balanced form [1].

A curve is symmetric with respect to the y-axis if its equation is unaltered when  $x$  is replaced by  $-x$  [2].

### *In the References section*

- [1] Smith, James. 18 November 1995. "Memory Models." Class notes from CS-570: Advanced Mass Storage System Techniques. Professor C.K. Wong. Harvard University, Cambridge, Massachusetts. Available from the author.
- [2] Burton, Andrea. 28 July 1996. "Symmetry." Class notes from MA-300: Calculus. Professor Ryan Patrick. Milwaukee School of Engineering, Milwaukee, WI. Available from the author.

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## Company Reports

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Intended for specialized audiences, technical business and company reports generally provide detailed information on specific programs, projects, procedures, or subjects, without presenting much background information because such knowledge is already assumed.

Although some technical business and company reports are written by personal authors associated with an organization, many reports feature "corporate" authors. These reports are sponsored, prepared, and published by organizations, corporations, laboratories, departments, and so on. Many technical business and company reports are intended for internal distribution in an organization.

In addition to fundamental bibliographic elements -- such as author and title -- the title page of a technical business or company report may feature a technical report number. This should be included in a footnote and bibliographic citation, if it appears. The title should always be italicized.

An indication should also appear that clarifies whether or not the technical business or company report was published or unpublished.

For proprietary or confidential documents, indicate that the document is not available for viewing, but that details concerning how the document supports the student's project may be obtained by contacting the author (i.e., the student).

*In the main text*

The telecommunications industry should experience dramatic changes in the next five years [1].

Mathematics was an early tool in urban planning [2].

The procedure for the production of vinylmagnesium chloride is extensive [3].

The procedure for cleanup of stainless steel vessels has long been standardized [4].

*In the References section*

- [1] Norlight Telecommunications. 14 June 1999. *1999 External Assessment. Unpublished technical report*. Milwaukee, WI: Norlight Telecommunications. A copy of this article is in the author's possession and may be consulted by contacting the author at smithj@msoe.edu .
- [2] Southeastern Wisconsin Regional Planning Commission. January 1966. *A Mathematical Approach to Urban Design -- A Progress Report on a Land Use Plan Design Model and a Land Use Simulation Model*. Technical Report Number 3. Waukesha, WI: Southeastern Regional Planning Commission. A copy of this article is in the author's possession and may be consulted by contacting the author at smithj@msoe.edu .
- [3] Brunner, T. 8 February 2001. *Vinylmagnesium Chloride, 1.6M in Tetrahydrofuran*. Unpublished Master Production Record. Catalog # 47655-2. St. Louis, MO: Sigma-Aldrich Fine Chemical Company. A copy of this Master Production Record is in the author's possession, but the document is not available for public viewing. For details, please contact the author at zappj@msoe.edu .
- [4] Aldrich Chemical Company. 1 May 2000. *Cleanup for Hastelloy, Stainless Steel and Glass-lined Vessels*. Unpublished Standard Operating Procedure (SOP). SOP# 322-007. Milwaukee, WI: Aldrich Chemical Company. A copy of this document is in the author's possession, but the document is not available for public viewing. For details, please contact the author at zappj@msoe.edu .

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## Conversation, Personal

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### *In the main text*

According to John Krieg of American Database Systems, the SQL Server allocates additional space to database objects in eight-page extents, or 16 KB increments [1].

### *In the References section*

- [1] Krieg, John. Vice-President of Technology, American Database Systems. 24 April 1997. Conversation with the author, Provo, UT.

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## Correspondence, Personal

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### *In the main text*

The syntax for the date conversion function is 'select datediff(dd,'1 Jan 1970', 'current date')' [1].

### *In the References section*

- [1] Jensen, Paul. 28 July 1997. Letter to author.

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## Dictionary or Similar Reference

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Occasionally, you may want to support a statement, definition, or fact using a standard reference, such as a dictionary, encyclopedia, atlas, etc. In these cases, when citing the source in the Reference entry, the facts of publication are typically omitted, *i.e.*, place of publication, publication, and date. However, the edition number should be mentioned. In the Reference entry, the page number is not cited, but rather the Latin abbreviation *s.v.*, which is *sub verbo* or "under the word."

*In the main text*

Sensors have verified increased activity and a rise in temperature in the Benguela Current, the strong current flowing northward along the southwestern coast of Africa [1].

*In the References section*

- [1] McGraw-Hill Dictionary of Scientific and Technical Terms, 4th ed., s.v. "Benguela Current."

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## **Dissertations and Theses**

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*In the main text*

The integral roots of an equation  $f(x) = 0$  can be determined when  $f(x)$  is a polynomial with integral coefficients [1].

The Frattini subgroup of a group  $G$  contains  $G'$  if, and only if, all maximal subgroups of  $G$  are normal [2].

*In the References section*

- [1] Tyler, Mallory. 1993. "Dirichlet's Theorem on Primes." Master's thesis, University of Wisconsin-Madison.
- [2] Ryan, Patrick. 1997. "The Frattini Subgroup in Group Theory." Ph.D. diss., Harvard University.

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## Electronic Resources

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Many books, journal articles, manuals, standards, newspaper articles, conferences, technical reports, and government documents are available electronically. Any examples of these types of items can be considered an electronic resource if it is retrieved by electronic methods (e.g., an online database search, an Internet search, or through the use of a variety of other computer services). Electronic resources also include computer software, such as programs, packages, languages, systems, and databases.

Any information obtained via the Internet is considered to have been retrieved from an electronic resource. The Internet features a number of programs and applications useful for obtaining information. They include e-mail, databases, and the Web. For the purposes of this style guide, sources of information obtained through these programs and applications are also broadly referred to as electronic resources.

### *Important elements in the citation of electronic resources.*

When citing an electronic resource, it is necessary, first, to determine if you are actually referring to a traditional resource (such as a print book or print article) that you are accessing electronically. If you are, then you must first describe bibliographically the resource. After the resource has been adequately described it is imperative to indicate that the item is an electronic resource and then to provide accurate details on how to obtain the item. To reiterate briefly the principles and purposes of good documentation, it is crucial that a reader is able to use documentation to locate and obtain a copy of the item that is cited. This applies equally to print and electronic resources. For example, it is virtually useless to cite a unique document obtained from a website without providing details on how a reader similarly can quickly and efficiently obtain a copy of the file.

When providing details on how to obtain electronic resources, it is extremely important to be accurate in the syntax, including punctuation and capitalization. For example, the success in accessing a website can be easily frustrated because all uppercase syntax was used with a remote server that happens to run a case-sensitive operating system.

The citations of most electronic resources should feature an *Available* field and an *Address* field.

Finally, for many online resources, it is necessary to provide details about when you accessed the information. This is because the status of many online resources is subject to change. Therefore, indicate the date that you access an online electronic resource by means of the following syntax: [Accessed: <date>].

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## E-mail

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Copies of all e-mail messages relevant to the production of the capstone report and thesis should be preserved by the writer. The essential elements in the citation of an e-mail include the following: author (of the message); date; subject of message in italics; format statement in brackets: [Internet, e-mail to ...]; and an *Available:* statement, which should provide sufficient information for the retrieval of a copy of the message from the writer.

### *In the main text*

An expanded and complete version of the genome table of *Treponema pallidum* is available on the Internet [1].

### *In the References section*

- [1] Fraser, Claire. 29 June 1998. Complete Genome Sequence *t. pallidum* site. [Internet, e-mail to the author]. *Available:* A copy of this e-mail message is available from the author at smith@msoe.edu.

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## Equations

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### *In the main text*

Beedle and Tugpeach in their important paper [1] on microfluidics developed the following equation:

$$a + b = x + z. \tag{1}$$

### *In the References section*

- [1] Beedle, George and Arnold Tugpeach. January 2007. "Important Microfluidic Concepts." *Journal of Microfluidic Applications* Volume 6(1), pp. 34-87.

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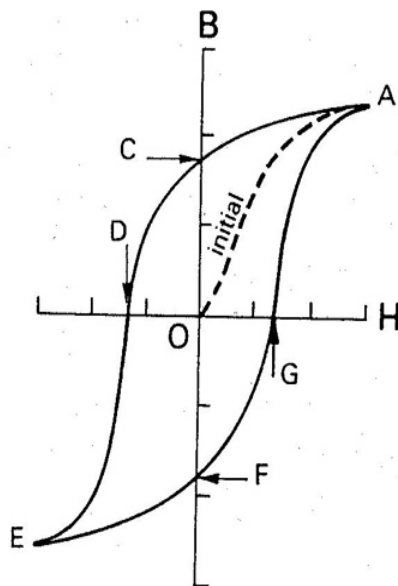
## Figures

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To document a visual item, use a reference number with the caption.

*In the main text*

**Figure 1: Hysteris Loop [1].**



*In the References section*

- [1] Dainmuth, John, ed. 1981. *Hysteris: Theory and Applications*. New York, N.Y.: John Wiley & Sons, Inc.

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## Foreign Language Sources

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When citing sources that appear in a foreign language, it is desirable to provide readers with a translation of a title.

*In the main text*

Le resume forme un tout avec le titre et le nom des auteurs [1].

*In the References section*

- [1] Lussier, Gilles. 1987. *La Redaction des Publications Scientifiques (The Editing of Scientific Publications)*. Quebec, Canada: Presses de l'Universite du Quebec.

If the title is given only in translation, the original language must be specified:

- [1] Lussier, Gilles. 1987. *The Editing of Scientific Publications* (in French). Quebec, Canada: Presses de l'Universitie du Quebec.

This situation also raises the question of how to treat a quotation that appears in a foreign language. The general rule is that both the original and a translation should be given. A student should include the original if the translation is intended to be a direct quotation. If a student reads a fact, translates the fact in his or her own mind, and then includes that fact in English in the document, but not in a way that is a direct quotation, then a reference number and reference source are needed -- but it is not necessary to include the original text as the excerpt is not a direct quotation.

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## **Government (U.S.), State Government, Public Documents, and Legal Documents**

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The variety of government, public, and legal documents available is immense. Generally, a reference should include the following elements -- if available or if relevant -- in the order given: country, state, city, county, or other government division issuing the document; legislative body, executive department, court, bureau, board, commission, or committee; subsidiary divisions, regional offices, and so forth; date of publication; title; individual author or editor; dates (including relevant dates other than publication date); report or series number; publisher (if different from the issuing body).

### *In the main text*

Finally, the variation among the population in the physiological characteristics of affecting COHb formation also contributes to the continuum of health effects [1].

Recycling has increased twenty-fold in the United States in the past five years [2].

Marathon County in Wisconsin is among the state's leaders in environmental releases in pounds -- in fact, it is fourth in the state [3].

### *In the References section*

- [1] Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce. House of Representatives. Ninety-Eighth Congress. Air Quality Standards. 1 October 1984. Serial No. 98-189. Washington: U.S. G.P.O.
- [2] U.S. Department of Commerce. Economics and Statistics Administration. Bureau of the Census. 1992. *Statistical Abstract of the United States: The National Data Book*. Lanham, MD: Bernan Press.
- [3] Wisconsin Department of Natural Resources. Bureau of Integrated Science Services & GEO Services. 1996. *Wisconsin Toxic Release Inventory 1996 Data Summary: Total Environmental Releases & Transfers Facilities Reporting by County*. Madison, WI: Wisconsin Department of Natural Resources.

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## Interviews

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### Interviews, Published

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#### *In the main text*

"In mass storage systems, sophisticated algorithms are more important than ever to position information in such a way that it is more quickly accessed." [1]

#### *In the References section*

- [1] Wong, C.K. 1983. Interview by G. Bongiovanni. In Marcia Bollard (ed.). *Advances in Mass Storage Systems: Interviews with the Experts*. Rockville, Maryland: Computer Science Press.
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### Interviews, Unpublished

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#### *In the main text*

Paul Jensen reports that he has "created an SQL query that eliminates the problem of "ghost records" appearing in the alphabetic title table once the record has been deleted from the database." [1] The query must be run with SA permissions on each individual "ghost."

#### *In the References section*

- [1] Jensen, Paul. 2 August 1997. Interview by the author, tape recording. Milwaukee, WI.

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## Journals – See Articles

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## Legal Documents – See United States government, state government, public documents, and legal documents

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## Library Databases

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### *In the main text*

A new technique allows for precise optical imaging at the nanometer scale [1].

The development of a new amperometric biochip may solve these problems [2].

### *In the References section*

- [1] A. Jones-Bey Haussen. December 2006. “Differential-Polarization Technique Enables Precise 3-D Nanoimaging.” *Laser Focus World* Volume 42(12), pp. 31. [Internet, WWW, Database]. *Available:* Available from the Applied Science and Technology Database; ADDRESS: <http://proquest.umi.com>; [Accessed: 27 August 2007].
- [2] Giuseppe-Elie, Anthony, Sean Brahim, Gymama Slaughter, Kevin Ward. June 2005. “Design of a Subcutaneous Implantable Biochip for Monitoring of Glucose and Lactate.” *IEEE Sensors Journal* Volume 5(3), pp. 345-355. [Internet, WWW, Database]. *Available:* Available from the IEEE Xplore Database; ADDRESS: <http://ieeexplore.ieee.org/>; [Accessed: 27 August 2007].

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## Magazines – See Articles

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## Manuals

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A manual generally is described as a "small book" that provides quantitative or descriptive information, data, and instructions. It is usually a "how-to" book that is not intended to be read from cover to cover. A good example of a manual is the user documentation that accompanies most software programs. Manuals are fundamental publications in all technical fields.

*In the main text*

The AlphaServer 800 is capable of operating at altitudes of 10,000 feet [1].

*In the References section*

- [1] Digital Equipment Corporation. 1997. *AlphaServer 800 User's Guide*. Order Number: EK-ASV80-UG. B01. Maynard, Massachusetts: Digital Equipment Corporation.

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## Multiple Sources

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A sentence or a paragraph in the main text of a capstone report and thesis may feature more than one reference number, each with its own corresponding reference source. Multiple reference numbers should be separated by commas and enclosed in a single set of brackets, similar to a matrix. However, whereas a sentence may feature more than one reference number, a single reference number cannot point to more than one reference source.

### *In the main text*

There is a single process called "cron" that is responsible for executing the commands in registered crontab files in a timely fashion [1]. It is started when the UNIX system is booted and does not stop until the UNIX system is shut down [1, 2, 3].

### *In the References section*

- [1] Glass, Graham. 1993. *UNIX for Programmers and Users*. Englewood Cliffs, New Jersey: Prentice Hall.
- [2] Gardner, James. 1994. *Learning UNIX*. 2nd ed. Indianapolis, Indiana: Sams Publishing.
- [3] Server Technical Publications. 20 March 1996. *Sybase SQL Server Installation and Configuration Guide for Digital UNIX*. Document ID: 34218-01-1101-01. Emeryville, CA: Sybase, Inc.

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## Newspapers

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*In the main text*

About the size of a dime, jet black with white spots and long, black-and-white striped antennae, the Asian Longhorned beetle is a new threat to Wisconsin [1].

*In the References section*

- [1] Sandin, Jo. 18 July 1998. "As Devastating Beetle Munches Toward Wisconsin, Experts Put Out An Alert: Asian Longhorned Beetle, Impervious To Pesticides, Destroys Hardwood Trees." *Milwaukee Journal Sentinel* State Edition, pp. 1C, 3C.

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**Notes – See Class Notes; see Presentations and Seminars**

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## **.PDF Documents Obtained from a Web Page**

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### *In the main text*

An effective method for aligning the workplace with strategy is the Balanced Scorecard [1].

Between 1988 and 1995, the federal government selected 97 major military bases for closure [2].

In 1947, the Air Force School of Aviation Medicine established the Arctic Aeromedical Laboratory (AAL) at Ladd Air Force Base near Fairbanks, Alaska [3].

### *In the References section*

- [1] The Balanced Scorecard Collaborative, Inc. 30 September 1999. "Balanced Scorecard NetConference: Balanced Scorecard Functional Standards." Slide presentation by Dr. David P. Norton and Laura M. Downing. [Internet, WWW, PDF]. *Available:* Available in .PDF format from The Balanced Scorecard Collaborative, Inc.; *Address:* <http://www.bscol.com/> . [Accessed: 7 November 1999]. A copy of this presentation is available from the author.
- [2] Department of Defense. 21 April 1999. "Economic Renewal: Community Reuse of Former Military Bases." [Internet, WWW, PDF]. *Available:* Available in .PDF format; *Address:* <http://www.defenselink.mil/pubs/reuse042199.pdf> . [Accessed: 22 November 1999].
- [3] Department of Defense. Assistant Secretary of Defense for Nuclear and Chemical and Biological Defense Programs. June 1997. Report On Search for Human Radiation Experiment Records 1944-1994. [Internet, WWW, PDF]. *Available:* Available in .PDF format; *Address:* <http://www.defenselink.mil/pubs/dodhre/Narratv.pdf> . [Accessed: 22 November 1999].

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## Patents

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*In the main text*

Researchers have successfully implemented an actively replicated, fault-tolerant database system based on a state machine approach that supports the concurrent execution of multiple transactions requested by a plurality of application clients communicating with the system [1].

It is possible to recover metal from steel waste products, such as mill scale, flue dust, and slag [2].

*In the References section*

- [1] Gostanian, Richard K. [Inventor] and John T. Ahern [Inventor]. 14 July 1998. "Performing Concurrent Transactions in a Replicated Database Environment." United States Patent 5,781,910.
- [2] Shields, Desmond L. [Inventor]. 9 December 1997. "Method For Metal Reduction of Steel Waste Products." United States Patent 5,695,543.

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## Papers

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## Papers from Conferences, Proceedings, Workshops, Symposia

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### *In the main text*

The nonlinear-transformation technique of Shanks can be usefully employed to improve perturbation solutions (regular or singular) of four fluid mechanical problems including high and low Prandtl-number free convection, longitudinal flow over a circular cylinder, unsteady flow of power-law fluids, and small Peclet-number forced convection from a sphere [1].

Sir Thomas Havelock appears to have been the first researcher to have introduced to ship theory the concept of a free wave system associated with a ship in steady motion [2].

### *In the References section*

- [1] Chien, Kuei-Yuan. "Application of Nonlinear-Transformation Technique to Perturbation Solutions in Fluid Mechanics." In *Midwestern Mechanics Conference*. 24-26 March 1975. *Developments In Mechanics. Proceedings of the 14th Midwestern Mechanics Conference*. Vol. 8. Norman, Oklahoma: University of Oklahoma Press, pp. 483-495.
  
- [2] Eggers, K. "On Free Waves." In Office of Naval Research, National Science Foundation, and The University of Michigan. 19-23 August 1963. *Proceedings of the International Seminar on Theoretical Wave-Resistance*. Vol. 1. Ann Arbor, Michigan: University of Michigan, pp. 191-196.

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## Papers, Unpublished

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The citation for unpublished papers that have been obtained at meetings, seminars, or workshops should feature a description of the circumstances for the reading of the paper, including location and a date.

*In the main text*

Learning the tremendous variety of chess openings available is itself a significant challenge [1].

*In the References section*

- [1] Barden, Leonard. April 1959. "Opening Traps You Should Know." Paper presented at the annual meeting of the British Chess Masters Society. London, England.

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## Papers, Working

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*In the main text*

One possible method of testing for nonlinearity is to use a procedure which combines redundancy and surrogate data techniques [1].

*In the References section*

- [1] Palus, Milan. 1994. "Detection of Nonlinearity and Chaos in Time Series." Working paper #94-10-053, Santa Fe Institute: New Mexico.

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## Periodicals – See Articles

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## Presentations and Seminars

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### *In the main text*

Simultaneous design of "both" filter banks becomes a bilinear model matching problem [1].

### *In the References section*

- [1] Francis, Bart. 28 September 1997. "From Digital Control to Digital Signal Processing." Presentation number 2 at the Allerton Workshop on Future Directions in System and Control. Monticello, Illinois.

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## Product Catalogs

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### *In the main text*

An appropriate circuit for the prototype was obtained, with the required specifications [1].

A variety of informational services and products are available from the government [2].

### *In the References section*

- [1] Browning Manufacturing Division. 1 December 1986. *Browning Power Transmission Equipment*. Catalog No. 100. Maysville, KY: Browning Manufacturing Division. Product catalog.

- [2] National Technical Information Service (NTIS). 1995. *1995-1996 NTIS Catalog of Products and Services*. Springfield, VA: U.S. Department of Commerce. Product catalog.

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## Software

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In a citation for software, every effort should be made to include the following elements, if available: author; date; name of program (in italics); format (*e.g.*, computer program, word processing program, spreadsheet program, etc.) in brackets; and an *Available*: statement, which should provide information sufficient for obtaining the software. An *Address*: statement is required if the software was downloaded from the Internet.

### *In the main text*

A variety of extremely useful software tools are available in medicine to help medical personnel determine a diagnosis [1].

Several freely available and easily obtained software programs exist to aid in the calculation of statistics in the social sciences [2].

### *In the References section*

- [1] Wu, A.H. and B. Jenkins. May 1990. *Advantage®: Diagnostic Ordering in Clinical Medicine* (Version 1.3). [Computer program]. *Available*: Health Sciences Consortium, 201 Silver Cedar Court, Chapel Hill, NC 27514.
- [2] Minsky, Ralph. April 2001. *Statistical Package for the Social Sciences Level M* (Version 8.1a). [Internet, WWW, Computer Program]. *Available*: Available from the StatisticsWeb website; *Address*: <http://www.statisticsweb.com/statsci>. [Accessed: 16 June 2003].

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## Standards, Specifications, Codes

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Required elements in a reference for a standard, specification, or code include the following: the responsible organization; the date; complete title information in italics; number or designation; place of publication and publisher (usually the publisher is the organization that produced the standard, specification, or code). For each standard, specification, and code referenced in a report, these elements should appear in the reference.

However, it may be appropriate and necessary to include additional information in a reference for a standard, specification, or code. Additional elements are required in the reference if they are featured in the standard, specification, or code. Such additional elements include, but are not limited to, the following:

- Agencies, sub-agencies, sections, committees, or individuals within an organization who actually produced the standard;
- Additional dates, including dates of revision and dates of re-approval;
- Additional title information;
- Appropriate section designations.

### *In the main text*

Regardless of the packaging method employed, the weight of any instrument set should be based on whether personnel can use proper body mechanics in carrying the set [1].

A patient connection port is "a Y-piece fitting or a unidirectional valve to which may be connected either a tracheal tube adaptor or a face mask angle piece." [2]

Screws should have a surface hardness of 45 HRC minimum [3].

"Each manufacturer shall establish and maintain procedures for defining and documenting design output in terms that allow an adequate evaluation of conformance to design input requirements." [4]

### *In the References section*

- [1] Association for the Advancement of Medical Instrumentation (AAMI) and American National Standards Institute (ANSI). 1996. *Guidelines for the Selection and Use of Reusable Rigid Sterilization Container Systems for Ethylene Oxide*

- Sterilization and Steam Sterilization in Health Care Facilities*. ANSI/AAMI ST33-1996. In AAMI Standards and Recommended Practices. Volume 1.1: Sterilization, Part 1 -- Sterilization in Health Care Facilities. Arlington, Virginia: Association for the Advancement of Medical Instrumentation.
- [2] ASTM International. ASTM Committee F29 on Anesthetic and Respiratory Equipment. Subcommittee F29.14 on Ventilators. 15 April 1991. Re-approved 1999. *Standard Specification for Electrically Powered Home Care Ventilators, Part 1 -- Positive-Pressure Ventilators and Ventilator Circuits*. Designation: F 1246-91. In Annual Book of ASTM Standards 2002. Section 13: Medical Devices and Services. Volume 13.01: Medical Devices; Emergency Medical Services. West Conshohocken, PA: ASTM International.
- [3] Society of Automotive Engineers, Inc. September 1997. "Thread Rolling Screws. SAE J81." In *2001 SAE Handbook*. Volume 1: *Metals, Materials, Fuels, Emissions, Threads, Fasteners, and Common Parts*. Warrendale, PA: Society of Automotive Engineers, Inc.
- [4] U.S. Department of Health and Human Services. Food and Drug Administration. Center for Devices and Radiological Health. April 2001. Code of Federal Regulations. Title 21, Volume 8. Part 820: *Quality System Regulation*. Section 820.30: Design Controls. 21CFR820.30. [Internet, WWW, PDF]. Available: Available in .PDF format; Address: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfCFR/CFRSearch.cfm?FR=820.30>. [Accessed: 8 May 2002].

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## Subsequent References to the Same Source

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When you cite the same source in a subsequent reference, simply use the reference number that was originally assigned to the source earlier in the text.

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## Tables

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*In the main text*

**Table 1: Numerical Values of the Function  $H(\Delta)$  [2].**

$\Delta$	$H$
0.7	0.0873
0.8	0.0980
0.9	0.1080
1.0	0.1175
1.2	0.1345
1.4	0.1492

*In the References section*

- [2] Schlichting, Dr. Hermann. 1960. *Boundary Layer Theory*. 4<sup>th</sup> ed. New York: McGraw-Hill Book Company, Inc.

Document pieces of information in tables with reference numbers.

*In the main text*

**Table 1: Milwaukee’s Population, MSW and Recyclables.**

Milwaukee (2002)		
Population (1997)	People	596,974 [16]
Area	Sq. mi.	1,793 [16]
Population density	People/sq. mi.	393
Total amount MSW generated (including yard waste)	Tons	342,166 [15]
Total amount MSW generated (including yard waste) per capita	Tons/c	0.57
Amount MSW	Tons	288,896 [15]
Amount MSW per capita	Tons/c	0.48
Amount recyclables	Tons	27,270 [15]
Amount recyclables per capita	Tons/c	0.05
Amount yard waste	Tons	26,000 [15]
Amount yard waste per capita	Tons/c	0.04

*In the References section*

- [15] Milwaukee Recycling Center. 2002. “Recycling in Milwaukee.” Milwaukee, WI.: Milwaukee Recycling Center, p. 4. Published brochure. A copy of this brochure is available from the author.
- [16] Office of Population Growth, Milwaukee, Wisconsin. 2002. “Population Growth in Milwaukee.” Milwaukee, WI.: Milwaukee Recycling Center, p. 20.

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## Technical Reports

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In addition to fundamental bibliographic elements -- such as an author and title -- the title page of a typical technical report usually features a technical report number (which may or may not be labeled as such on the title page), and information on sponsoring organizations. Many reports feature more than one sponsor. The report number and any sponsors are crucial information in a technical report citation.

*In the main text*

Computers are essential tools in the structural analysis of large buildings [1].

A selection process that features strength testing for materials handling jobs could help companies to avoid litigation [2].

As early as the mid-1960s, the city of Milwaukee formalized mathematical approaches to urban design and land use issues [3].

*In the References section*

- [1] Lang, T.E. 1 April 1967. *Summary of the Functions and Capabilities of the Structural Analysis and Matrix Interpretive System Computer Program*. Technical Report 32-1075. Pasadena, California: Jet Propulsion Laboratory, California Institute of Technology.
- [2] Chaffin, Don B.; Gary D. Herrin; W. Monroe Keyserling; and James A. Foulke. October 1976. *Pre-Employment Strength Testing in Selecting Workers for Materials Handling Jobs*. Technical Report CDC-99-74-62. Cincinnati, OH: National Institute for Occupational Safety and Health; Ann Arbor, Michigan: The University of Michigan.
- [3] Southeastern Wisconsin Regional Planning Commission. January 1966. *A Mathematical Approach to Urban Design -- A Progress Report on a Land Use Plan Design Model and a Land Use Simulation Model*. Technical Report Number 3. Waukesha, Wisconsin: Southeastern Wisconsin Regional Planning Commission.

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**Theses and Dissertations – See Dissertations and Theses**

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## Web Pages

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In a reference that cites a web page, or information obtained from a web page, the citation generally should include all traditional bibliographic information that appears on the page, and an indication that the source is an electronic resource. In citing the bibliographic information, a good rule of thumb is to look for an author (this includes corporate authors, such as a business, company, or association), a title, a date, any unique document or identification numbers, and so on.

Keep in mind that some of this information may not appear on the page that you are citing, but rather on page(s) immediately preceding. Some of the information – particularly dates – may be available in the source code for a page. Click “View” and then “Source” on the toolbar of a browser to examine the source code. Use the most recent date that appears on the page (by general consensus, the date the web page was created or last modified usually appears at the bottom), or the date that the document on the web page was written or published. It is acceptable to employ the most recent copyright date. Sometimes, a web page may not feature a date; in this case, it is acceptable not to include a date for the resource in the reference. An access date is still required, however.

It is important to keep in mind that when you are looking at a page, often you are looking at a traditional document, such as a newspaper or journal article, that has merely been converted to a web page. The traditional document should be described with as much traditional bibliographic information as possible. Finally, in an [Accessed: <date>] statement, include information as to when you accessed the site.

### *In the main text*

James Madison suggested numerous interesting amendments to the Constitution [1].

In the chemistry of building materials, it is useful to numerically simulate drying and shrinking of materials [2].

Copyright law with respect to the Internet continues to be an unsettled field of law [3].

The Fluid Power Institute of the Milwaukee School of Engineering has several important clients in industry [4].

Athletes who have achieved some national notoriety are members of the Milwaukee School of Engineering Athletic Hall of Fame [5].

Harley-Davidson is continuing to grow and to expand [6].

*In the References section*

- [1] Madison, James. 1789. "James Madison: Amendments to the Constitution." From the Congressional Review. Vol. I, pp. 423-237. [Internet, WWW]. *Available:* Available from the University of Arkansas website; *Address:* <http://www.uark.edu/depts/comminfo/www/proposed.html>. [Accessed: 7 April 1995]. A copy of this document is available from the author.
- [2] Wittman, Folker. 11 July 1995. "Numerical Simulation of Drying and Shrinkage." ETH Zurich Research Project. Institute of Building Materials. [Internet, WWW]. *Available:* Available from ETH website; *Address:* <http://www-ir.inf.ethz.ch/research/baum/baustoffe/wittmann/pj.02.html>. [Accessed: 28 July 1995]. A copy of this article is available from the author.
- [3] Loundy, David J. 1995. "E-Law 3.0.1: Computer Information Systems Law and System Operator Liability in 1995." [Internet, WWW]. *Available:* Available from the David Loundy E-Law website; *Address:* <http://www.leepfrog.com/E-Law/E-Law.html>. [Accessed: 14 March 1995]. A copy of this paper is available from the author.
- [4] "MSOE Fluid Power Institute." 13 October 1996. [Internet, WWW]. *Available:* Available from the Milwaukee School of Engineering's website; *Address:* <http://www.msOE.edu/fpi/>; [Accessed: 13 November 1996]. A copy of this page is available from the author.
- [5] "MSOE Athletic Hall of Fame." Fall 1995. *The Alumnus*. Milwaukee, WI: Milwaukee School of Engineering. [Internet, WWW]. *Available:* Available from the Milwaukee School of Engineering's website; *Address:* <http://www.msOE.edu/alumni/alumnus/95fall/#Athletic>; [Accessed: 16 December 1995]. A copy of this article is available from the author.
- [6] *PRNewswire*. 28 August 1996. "Harley-Davidson, Inc. Increases Dividends, Adds New Director." [Internet, WWW]. *Available:* Available from the PRNewswire website; *Address:* <http://www.prnewswire.com/>; [Accessed: 9 September 1996].

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**Workshops – See papers from conferences, proceedings, workshops, symposia**

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**Appendix B.**  
**Copyright Issues**

When including copyright-protected material in a capstone report or a thesis, a student is responsible for obtaining written permission from the copyright holder in order to use the material. A copy of the written permission must also appear in an Appendix of the thesis or capstone report.

In order to obtain permission from a copyright holder to use protected material, write a letter to the copyright holder. An example of a request letter follows.

TO: Company XYZ

Dear Company XYZ,

My name is John Smith. I am a graduate student in the Master of Science in Engineering program at the Milwaukee School of Engineering in Milwaukee, Wisconsin. I am in the process of completing my Master's Capstone Report entitled, "An Investigation of Latch-Based and Flip-Flop Derivation in Digital System Clocking."

I am requesting permission to use material for which Company XYZ holds the copyright. Specifically, I am requesting permission to use the following copyright-protected material in my capstone report:

- [1] Figure 6-27 on page 203 of the book *Digital Signal Processing: An Interesting Introduction* by Brandon Batzler (Chapel Hill, North Carolina: EE Press, 2003). The copyright owner of the book is Company XYZ.
- [2] Section 12-5 ("A/D Conversion, Quantization Noise, and Oversampling") on pages 252 through 253 of the book *Digital Signal Processing: An Interesting Introduction* by Brandon Batzler (Chapel Hill, North Carolina: EE Press, 2003). The copyright owner of the book is Company XYZ.

Three copies each of [1] and [2] above are to be placed in three copies of my capstone report. One copy of the capstone report will be placed in the Electrical Engineering department file; one copy of the capstone report will be kept in the Thesis Archives which has no public access; and one copy of the capstone report will be placed in the library where interested patrons can check it out.

If you have any questions, please feel free to contact me at 414-277-7777, or via e-mail at [smithj@msoe.edu](mailto:smithj@msoe.edu).

Thank you for your consideration in this matter,

John Smith

Copyright law protects original works of authorship that are fixed in any tangible medium of expression from which they can be perceived, reproduced, or

otherwise communicated, either directly or with the aid of a machine or a device.  
"Works of authorship" includes:

- literary works (including computer programs and related documentation);
- musical works (including accompanying words);
- dramatic works (including accompanying works);
- pantomines and choreographic works;
- pictorial, graphic and sculptural works;
- motion pictures and other audiovisual works;
- sound recordings;
- architectural works;
- compilations, collective works and derivative works.

Protected work may -- or may not -- feature a copyright notice.

Copyright-protected material includes a large array of created works: books, articles, reports, maps, charts, drawings, icons, data sheets, standards, documents produced by companies and web pages are all examples of material that may be copyright-protected.

The "Fair Use" provision in Copyright Law does allow "use of a copyrighted work for purposes such as criticism, comment, news reporting, teaching, scholarship or research" [see Kinney & Lange, 1997, *Overview of Intellectual Property for Business Lawyers*, Ninth Edition (Minneapolis, Minnesota: Kinney & Lange), p. 123].

However, only a court of law can determine if the copying of copyright-protected material constitutes "Fair Use." When a court of law considers whether or not a piece of copying constitutes "Fair Use," the court considers the following factors: "purpose and character of use, including whether it is commercial or nonprofit"; "nature of the work," including whether the copied work is scholarly or commercial; "amount or sustainability of the portion used in relation to the copyrighted work as a whole"; "effect of the use upon the potential market for or the value of the work." According to *Stewart v. Abend*, 495 U.S. 207 (1990), the most important of these four factors is "the effect the use has on the market for the underlying work" [see Kinney & Lange, 1997, *Overview of Intellectual Property for Business Lawyers*, Ninth Edition (Minneapolis, Minnesota: Kinney & Lange), p. 124].

When considering whether or not a piece of copying constitutes "Fair Use," a court considers three fair use tests [see R.S. Talab, 1999, *Commonsense Copyright: A Guide for Educators and Librarians* (Jefferson, North Carolina: McFarland & Company, Inc., Publishers), pp. 27-28]:

*Brevity* -- "The relative amount of what is copied should be brief, for example, 250 words for poems, 2,500 words or 10 percent of articles, stories, and so forth ... ."

*Spontaneity* -- A spontaneous copying of a work would "not be needed enough ahead of time that reprints or permission could be acquired."

*Cumulative effect* -- This is "the combination of small uses that rise to such a proportion that economic harm is done ... ."

You may use these guidelines to begin to assess whether or not your use of copyright-protected material is "Fair Use." However, as a general policy, MSOE recommends that all students who produce a thesis or capstone report must obtain permission from the copyright holder to use all copyright-protected material in the thesis or capstone.

If you are uncertain as to whether or not material you wish to use is protected, contact the MSOE Library for guidance.

**Appendix C.**

**BINDING OF THE THESIS OR REPORT:  
PERSONAL COPIES FOR STUDENTS**

The Milwaukee School of Engineering (MSOE) Library offers a service in which it will provide bound personal copies of theses and capstone reports for MSOE students. Students are responsible for the cost of all bound personal copies. Please complete the following request form for bound personal copies. Turn the completed form into the MSOE library for processing.



## MSOE Graduate Programs

### Personal Thesis / Capstone Bound Copy -- Order Form

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MSOE graduate students who have successfully completed a thesis or capstone project as part of their program requirements may order bound copies of their thesis or capstone projects. Binding is black hardcover featuring white lettering (Arial font type).

Orders for personal copies should be placed through the MSOE Library. Use this order form to request your copies.

**Cost:** Two pricing options are available. The cost of a bound thesis or capstone project *without* title information on the front cover is \$15 per thesis or capstone project **volume**. The cost of a bound thesis or capstone project *with* title information on the front cover is \$17 per thesis or capstone project **volume**. These prices are subject to change without notification. *Please note that large projects may need to be bound in two (2) separate volumes; cost for all binding is determined per volume.*

**Payment:** Payment should be in the form of cash or a check. Checks should be made out to "MSOE." Payment should accompany this order form and should be made in the MSOE Library.

**Your Name:** \_\_\_\_\_

**Your Contact Information (telephone number or email):** \_\_\_\_\_

**Total Number of copies requested:** \_\_\_\_

**Number of copies featuring plain cover with title on spine (cost is \$15 per copy and depending on length of title, entire title may not appear on spine):** \_\_\_\_

**Number of copies featuring title on spine; and title on front cover (cost is \$17 per copy; depending on length of title, entire title may not appear on spine; title on front cover is limited to three lines):** \_\_\_\_\_

**Special Instructions:**

**Total Cost:** \_\_\_\_\_ **Date Paid:** \_\_\_\_\_

The student must supply the library with suitable paper copies of the thesis or capstone project to be bound. The thesis or capstone project is bound as part of the library's normal bindery function. This means that the thesis or project is sent to the bindery in one month and is returned the following month.

Questions? Contact Gary Shimek at [shimek@msoe.edu](mailto:shimek@msoe.edu) or (414) 277-7181.

**Appendix D.**  
**Graduate Programs Council (GPC)**  
**Policy 009**

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**Graduate Programs Council Policy No. 009****Milwaukee School of Engineering**Last Modified: March 29, 2007 Printed on: June 28, 2007

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**Policy Number 009****Process for Final Approval of Graduate Program Thesis and Capstone Report Format****Adopted: January 29, 2001****Notes: Amended, February 17, 2003 and March 26, 2007**

1. The graduate student submits a draft copy with the required format approval form. After the defense, and upon approval of the document content and format by the Faculty Advisor and committee, the student is expected to deliver a paper copy of the report or thesis to the Director of the Library (2<sup>nd</sup> floor of Library Building) for a final check of the format. The report or thesis submitted to the Library must be submitted with a *Graduate Program Thesis/Capstone Report Format Approval Form*. Until the format is approved, the document is considered to be a draft.

The draft report, or thesis, submitted by the graduate student should comply with the formatting requirements and guidelines of their program. Graduate students should contact their Program Director to obtain the formatting requirements and guidelines. **It is the responsibility of the student and the Faculty Advisor that all submitted drafts substantially comply with requirements for technical content, academic honesty, proper grammar and language, and formatting. The Library staff will verify the draft meets the requirements but is not responsible for major editing. To assist the student and Faculty Advisor in meeting these requirements, the Library maintains standards and requirements for formatting. These standards are available on the Library Intranet web site, under “Library Resources”, and/or can be found at [http://w3.msoe.edu/library/grad\\_student\\_doc\\_standards.shtml](http://w3.msoe.edu/library/grad_student_doc_standards.shtml) (Amendment, February 17, 2003)**

2. Library personnel review the document and provide feedback to the student and Faculty Advisor.

Within 14 calendar days after the graduate student submits the draft report/thesis to the Director of the Library, the document will be reviewed, with the following possible outcomes:

a. The document fully complies with formatting standards and is approved as submitted.

- b. The document substantially complies with formatting standards, is fully reviewed, and deficiencies are noted.
- c. The document does not substantially comply with formatting standards, is not fully reviewed, and is returned to the student.

After the review, the graduate student may pick up feedback from the Director of the Library (or the feedback may be e-mailed to the student), which will indicate (i) approval, (ii) provide comments on remaining deficiencies (for those documents that substantially comply with the formatting standards), or (iii) explain that the document does not substantially comply with the formatting standards and cannot be fully reviewed until major changes or corrections are made. A copy of the comments will also be sent to the Faculty Advisor, and, in the case where the document does not substantially comply with the formatting standards, to the Program Director and the Department Chairperson of the department offering the program. Documents that are not fully reviewed upon original submission will need to be re-submitted for a full review.

A review may require more than 14 days if the library personnel are simultaneously reviewing a large number of reports and theses. In such cases, students will be notified of the delay, the reasons for it, and the date the student can expect the review to be completed.

- 3. The student submits a revised copy of the report to the Library.

If deficiencies were noted on the first submission of a report, the student will submit a revised copy to the library once the deficiencies are corrected. Library personnel will conduct a “spot check” to verify that this submission is a corrected document. If deficiencies are still noted, the document will be returned to the Faculty Advisor for further correction with a memo listing remaining deficiencies. In cases where the document was resubmitted without a significant number of the original deficiencies addressed, the Library will also send a copy of the memo to the Program Director and Department Chairperson of the department offering the degree.

- 4. Upon final approval, the student submits to the Library final copies as required.

After the paper copy is fully approved, the Library will notify the graduate student to submit a total of three final paper copies and an electronic copy (*i.e.*, a .pdf file), and will review it for equivalence with the paper copy. The student must also submit at this time three signed copies of the Report/Thesis Approval Form, which indicate approval of the report by the committee.

- 5. The Library forwards the completed *Graduate Program Thesis/Capstone Report Format Approval Form* and one copy of the thesis/report to the Program Director, at which time the Program Director will complete the appropriate form to report the grade to the Office of the Registrar.

**Appendix E.**  
**Graduate Program Thesis / Capstone Report**  
**Format Approval Form**

## GRADUATE-PROGRAM THESIS/CAPSTONE-REPORT FORMAT APPROVAL FORM

**(1) Student should complete the following:**

Name \_\_\_\_\_ Student No. \_\_\_\_\_

Phone Number(s) \_\_\_\_\_ daytime \_\_\_\_\_ evening \_\_\_\_\_

E-mail address \_\_\_\_\_

Advisor's Name \_\_\_\_\_ Advisor's Phone No. \_\_\_\_\_

Title of Report/Thesis \_\_\_\_\_

Date DRAFT Submitted to Library \_\_\_\_\_

**(2) Library will complete the following regarding the DRAFT:**

Date Evaluation of DRAFT  
Completed \_\_\_\_\_

Compliance:  DRAFT DOES COMPLY       DRAFT DOES NOT COMPLY  
(Deficiencies detailed on a  
separate sheet)

**(3) Student's advisor submits this form with the FINAL:**

Date FINAL Submitted to  
Library \_\_\_\_\_

**(4) Library will complete and sign this section regarding the FINAL:**

Date Evaluation of FINAL  
Completed \_\_\_\_\_

Compliance:  FINAL DOES COMPLY       FINAL DOES NOT COMPLY  
(Deficiencies detailed on a  
separate sheet)

Signature of Person Evaluating  
FINAL \_\_\_\_\_

Printed Name of Person Evaluating

FINAL \_\_\_\_\_

- (5) Library will complete and sign this section regarding the .pdf file (electronic copy), and three printed copies. An acceptable .pdf file has been received, equivalent to the paper copy, and all three paper copies (final) are received.**

Signature of Library representative

\_\_\_\_\_ Date \_\_\_\_\_

- (6) Library returns completed form and one document copy to Program Director, at which time the Program Director will complete the appropriate form to report the grade to the Registrar's Office.**

**Appendix F.**

**Thesis / Capstone Report**

**Library “Noncirculation Status” Request Form**

## Thesis/Capstone Project

### Library “Noncirculation Status” Request Form

**Walter Schroeder Library  
Milwaukee School of Engineering**

**Last Revision: 10 May 2000**

With the approval of both the appropriate graduate program director and a student’s graduate thesis/capstone project advisor, a thesis or a capstone project may be prohibited from circulating to the public from the MSOE Library. This request form must stipulate or contain:

- (a). the title of the document;
- (b). the name of the student who is the author of the document;
- (c). the name of the person initiating the request (generally, this is the student);
- (d). the length of time that the document cannot circulate;
- (e). the reason(s) for designating the document a noncirculating item;
- (f). other, including special conditions, or more restrictive arrangements;
- (g). appropriate signatures.

When a thesis or capstone project is designated *noncirculating* and *thesis archives only*, a copy of the document will be placed in the locked library thesis archives room only. A copy of the document will *not* be placed in the MSOE Library’s circulating collection. The public does not have access to the thesis archives room. A database record for the noncirculating thesis will be created in the Library’s catalog with the following information: title, author, date of completion, and a note stating that the document is noncirculating and not available to the public. The same information is also added to the list of completed theses/capstone projects available on the library’s webpages. Both the database and the webpages are available to the public. If more stringent restrictions are necessary – for example, if it is desired that a database record should *not* be created – these restrictions should be detailed in section (f).

**Return this completed form to the Director of the MSOE Library**

(a). **Title of document:** \_\_\_\_\_

\_\_\_\_\_

(b). **Name of student (author):** \_\_\_\_\_

(c). **Name of person initiating request:** \_\_\_\_\_

(d). **Noncirculation status time period** (*if permanent noncirculating status is requested, write "permanent"*):

\_\_\_\_\_

(e). **Reason(s) for noncirculation** (*reasons may include "contains confidential information;" "contains sensitive or proprietary information;" "student's company does not wish to release information contained in document;" "program department Chair wishes to restrict access;" etc.*):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(f). **Other:**

Should a database record be created? ..... Circle one **YES** **NO**

Should a library webpage entry be created? ..... Circle one **YES** **NO**

List other restrictions: \_\_\_\_\_

\_\_\_\_\_

(g). **Signatures:**

\_\_\_\_\_  
Student's Signature and Date

\_\_\_\_\_  
Advisor's Signature and Date

\_\_\_\_\_  
Program Director's Signature and Date