

# **FORM & STYLE**

The Guide  
to Writing a Technical Report  
for Students in  
Engineering and Computer Science 281  
and  
Engineering 410

Concordia University

Fourth Edition

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# Table of Contents

	PREFACE	iv
1.	INTRODUCTION	1
2.	ORGANIZATION OF THE REPORT	2
	2.1 Abstract	2
	2.2 Title Page	3
	2.3 Table of Contents	3
	2.4 List of Figures & List of Tables	3
	2.5 Preface	4
	2.6 Body (Text) of the Report	4
	2.6.1 The Introduction	4
	2.6.2 The Main Text	4
	2.6.3 The Concluding Chapter	4
	2.7 List of References	5
	2.8 Appendices	5
	2.9 Topic Approval	5
3.	LAYOUT	6
	3.1 Headings	6
	3.2 Graphics	7
	3.3 Mechanics	8
	3.3.1 Pagination	8
	3.3.2 Spacing	8
	3.3.3 Quotation Marks and Other Punctuation	9
	3.3.4 Equations in the Text	9
	3.3.5 Capitalization of Words	9
	3.3.6 “Widows” and “Orphans”	9
	3.3.7 Typeface and Size	10
	3.3.8 Binding	10

4.	DOCUMENTATION	11
4.1	In-text Referencing	11
4.1.1	Referencing Quotations	11
4.1.2	Referencing Paraphrases of information	11
4.1.3	Referencing Graphics	12
4.2	Reference Page Layout	12
4.3	Referencing Different Types of Sources	13
5.	PLAGIARISM	16
6.	SEXIST WRITING	17
7.	CONCLUSION: SOME FINAL POINTS	18
	APPENDIX A: Sample Title Pages	19
	APPENDIX B: Sample List of Figures	21
	APPENDIX C: Sample Reference Page	22
	APPENDIX D: Rules for Writing Numbers	23
	APPENDIX E: Rules for Writing SI Symbols	24

## PREFACE

This edition of *Form & Style* builds substantially on the third version of *Form & Style*, published in 1990 by Jack Bordan. It has been revised to take into account the comprehensive changes that have occurred in professional communication over recent years.

Thanks are due to the technical writing faculty members and students who have contributed their ideas to this report.

Patrick McDonagh  
May 2000

## **1. INTRODUCTION**

There are many manuals of form and style. However, the format of a report must follow the convention established by the client, the company, or the journal for which the report is written. For ENCS 281 and ENGR 410, the conventions which you must follow are set out in this document.

This report will help you to organize the elements of your report, format and lay out the document, and reference your sources. It also includes samples for the title pages, List of Figures, and reference page.

## 2. ORGANIZATION OF THE REPORT

Your technical report will contain the following elements, in this order:

Front Matter:	Abstract Title Page Table of Contents List of Figures/List of Tables Preface (optional)
Main Content:	The Body (Text) of Report
End Matter:	List of References Appendices (optional) Topic Approval

This chapter of *Form & Style* will describe each of these components of the report in turn.

### 2.1 Abstract

The abstract is the first page of the report. You should write an informative (rather than descriptive) abstract of about 150 words, setting out the objective and scope of the report, and its conclusions. Readers frequently decide whether to read a report based on a reading of the abstract. Your abstract must be able to stand on its own, apart from the full report, and so it must include the following heading:

ABSTRACT  
Title of Report  
Author's Name

On the line immediately following your abstract, and on the same page, give at least three "key words" from your report that could be used to index it in a database. Head the list with the words Key Words, followed by a colon, as shown below:

Key Words: . . . , . . . , . . .

## 2.2 Title Page

The title page is the first page of the “front matter” of the report. In terms of pagination, it counts as a page of the front matter, but is not numbered (see Section 3.3.1, Pagination).

Sample title pages for ENCS 281 and ENGR 410 are given in Appendix A.

## 2.3 Table of Contents

Use the “Table of Contents” (p. ii) of *Form & Style* as your guide in constructing your own Table of Contents. Note that your entries must agree, in content and type style, with the headings in your text.

You should include chapter headings as well as first and second level sub-headings in your Table of Contents. Sub-headings at the third level and beyond (e.g., headings with three decimals, such as 2.3.4.1) need not be included in the Table of Contents.

## 2.4 List of Figures & List of Tables

You should have a separate list for each illustration series, arranged like the Table of Contents. Thus for your List of Figures, include figure number, caption, and page number; for your List of Tables, include table number, heading, and page number. Normally, a separate page is devoted to each list, but if there are relatively few entries, both lists may be on the same page.

Ensure that captions/headings in the List of Figures and List of Tables conform to those on the figures and the tables in the text, and that page numbers given in the List of Figures and List of Tables are accurate.

See Appendix B for a sample List of Figures.

## **2.5 Preface**

The Preface of the report is optional. You would include a Preface only if you wish to thank specific people or acknowledge their assistance in the production of your report; or if you wish to discuss a point that may be relevant to the report but which cannot be fit comfortably into the body of the report or an appendix (e.g., to explain the circumstances by which you came to write the report).

## **2.6 Body (Text) of the Report**

The body of your report should be divided into chapters and sub-sections appropriate to the subject. The introduction to the report is your first chapter, and the conclusion/summary is the last. The bulk of your material - description, research, and analysis - will form the intervening chapters and sub-sections.

### **2.6.1 The Introduction**

The introduction is Chapter 1 of your report, and should describe the topic and define the scope of the report. It should also give the reader a clear idea of what material is to follow.

### **2.6.2 The Main Text**

The main text should be divided into chapters and sub-sections; the number and organization of chapters and sub-sections will naturally depend upon the topic of your report.

### **2.6.3 The Concluding Chapter**

The concluding chapter may be a summary of the material presented, one or more conclusions drawn from your research, and/or one or more recommendations. Your choice will depend on the subject of your report. Use a summary as your concluding section if your report is descriptive. Conclusions are appropriate for a report on a research or development project. An investigation to determine a course of action should end with a recommendations section. The title of your concluding section (i.e., "Summary," "Conclusion," or "Recommendations") should reflect the form you have used.

Do not introduce new material in your concluding section.

Your concluding section should be crisp and clear - you want to leave your readers with a solid understanding of what you have been discussing in the report.

## 2.7 List of References

Your “reference” page should be titled either “List of References” or simply “References.” It follows your concluding section. As it is not a chapter, it does not require a chapter number.

The reference list identifies all sources from which you have taken information, either as quoted text, paraphrased material, or graphic material. However, it does not list all sources of information on your topic, nor even all those that you may have glanced at or read in the course of writing your report.

For information on the documentation format to use in referencing your sources, see Chapter 4, Documentation. Appendix C gives a sample reference page.

Failure to acknowledge the work of others is unethical and illegal, both in the university and in the professional world. See Chapter 5, Plagiarism.

## 2.8 Appendices

An appendix is for added or appended material that may be relevant to your report but which cannot be placed comfortably in the body of the report. Use it for supplementary material which, if included in the body of the text, would interrupt the flow. For example, a lengthy derivation of an equation (unless the derivation is the subject of your report), a complete computer programme, or a laboratory log of an experiment would be included in the appendix. A bulky folded map or drawing should also be put in an appendix, as should corporate or commercial material, such as product specifications or promotional documents.

You should refer your readers to the appendix at the relevant point in the text. *Form & Style* has five appendices.

## 2.9 Topic Approval

You are required to get approval for your technical report, either from your professor (in ENCS 281) or a representative of your department (in ENGR 410). A copy of the topic approval form or letter must be included as the final page of your report. It should appear in the Table of Contents.

### 3. LAYOUT

Clear layout and presentation will make your report more accessible to your readers. Some key considerations in layout include headings, illustrations, and other strategies that could be classified, broadly, as the “mechanics” of report writing. These latter are not solely layout concerns, but are included in this portion of *Form & Style* for the sake of convenience.

#### 3.1 Headings

Headings are the writer's direction signals to the reader. They form a major contribution to your report's readability. All headings should be followed by text, before the next subheading.

Headings should not be part of the text; the text should be able to stand alone. As a result, you should never refer back to the heading from the text, but rather write the text so that its meaning does not depend on the heading. Add headings to make the text more accessible. See the examples below:

GOOD: Headings

Headings are the writer's direction signals to the reader.

GOOD: Headings

Readers need headings to follow a text with ease and understanding.

POOR: Headings

They are the writer's direction signals to the reader.

Be sure that your headings reflect accurately the material that appears beneath them. Good headings aid immeasurably in making a document easy to read and understand. *Form & Style* requires the use of a decimal numbering system to number your headings.

First level (chapter) :	Arabic numerals	1, 2, 3, etc.
Second level:	decimal subdivision of first level	2.1, 2.2, 2.3, etc.
Third level:	further subdivision	2.1.1, 2.1.2, 2.1.3, etc.
Fourth level:	more subdivision	2.1.1.1, 2.1.1.2, etc.

Headings should be placed on the page in the following manner.

First level

## **1. CENTERED BOLD CAPITALS**

First-level (chapter) headings begin on a new page. Text follows two to four spaces beneath.

Second level

### **1.1 Centered Bold Initial Capitals**

Second-level headings do not require a fresh page. There is a double space before text following a second-level heading.

Third level

#### **1.1.1 Initial Bold Capitals at Margin**

Third-level headings are also followed by a double-space before text.

Fourth level

**1.1.1.1 Initial Bold Capitals, Indented.** Fourth-level headings on the same line as text. They are followed by a period.

Fifth level

**The fifth-level heading** is rarely used, and is an exception to the rule that headings stand separately from the text. In this case, the fifth-level heading also forms the initial words of the paragraph which it “heads.” It should be in bold print.

## **3.2 Graphics**

Graphic elements of the report include all illustrations, graphs, charts and tables. Each graphic must be numbered and titled appropriately.

All *illustrations, drawings, maps, graphs* and *charts* are considered to be *figures*, and should be included in the list of figures. Place the number and caption at the figure’s base.

However, for *tables*, the number and heading go above the table.

All tables and figures should be referred to in your text at the relevant point. The textual reference should precede the graphic. If a particular graphic is mentioned more than once, then the graphic should follow the first textual reference.

Figures and tables should be incorporated into the text. The only exceptions would be for material best suited for the appendix (see Section 2.8, Appendices).

Ensure that all images - figures and tables - are clear and legible. Do not include poorly photocopied images or images that have been downloaded from the World Wide Web in a low-resolution format. Finally, ensure that you give each graphic a comfortable amount of space on the page; graphics should not be crammed between text or squeezed into the margin.

All figures and tables should be referenced, unless they are your own original work. See Section 4.1.3, Referencing Graphics.

### 3.3 Mechanics

The mechanics of document layout include a range of considerations that contribute to the accessibility and readability of your report. These include pagination conventions, text spacing conventions, quotation marks and other punctuation conventions, guidelines for incorporating equations into your text, capitalization conventions, “widow” and “orphan” problems, typeface and style considerations, and finally, binding guidelines. Conventions governing how to write numbers, while also appropriate for this section, are fairly extensive and thus are placed in Appendix D. Conventions for using SI (metric) symbols are given in Appendix E.

#### 3.3.1 Pagination

Pagination of the report can be divided into that for the main body and end matter, and that for the front matter.

**3.3.1.1 Main Body Pagination.** The pages of the body of the report are numbered 1, 2, 3, etc., starting with the first page of the introduction and including all subsequent pages, through the appendices to the topic approval. The number “1” of the first page of the body is centered at the bottom of the page; however, all subsequent numbers are placed at the upper right corner of the page.

**3.3.1.2 Front Matter Pagination.** For the front matter, a different numbering is used. The abstract is not included in the pagination at all. The title page counts as the first page of the report’s front matter, but is not numbered. The Table of Contents is the second page of the front matter, and it receives a small roman numeral “ii” centered at the bottom of the page. The front-matter pages that follow are all numbered with small roman numerals: iii, iv, v, vi, etc. All front matter pagination is centered at the bottom of the page.

#### 3.3.2 Spacing

The text of the report should be double-spaced, printed on one side of the page only. Entries on the Reference page should be single-spaced, but each entry should have a double-space before the next entry. See the sample Reference page in Appendix C.

In the text itself, you should leave one space after commas and other forms of internal punctuation (e.g., colons, semi-colons); leave two spaces after periods and other forms of end punctuation (e.g., question marks).

### **3.3.3 Quotation Marks and Other Punctuation**

You should use quotation marks whenever you quote directly from a source. Punctuation should be placed inside quotation marks; reference numbers, however, should be placed outside of quotation marks.

### **3.3.4 Equations in the Text**

If you are including equations in your text, you should treat them as part of the sentence which leads into the equation. That is, you should incorporate equations smoothly into your sentence structure.

### **3.3.5 Capitalization of Words**

As a general rule, you should capitalize only proper names of individuals and organizations. Words such as “kilograms” and “civil engineering” do not require capitals (although “department of Civil Engineering” does, as it refers to a specific organization).

### **3.3.6 “Widows” and “Orphans”**

The terms “widow” and “orphan” refer to typographic anomalies that can occur when you are preparing a final document for presentation.

An “orphan” is a word or short section of a line isolated at the bottom of a paragraph or a page. Occasionally reports will have orphan headings - that is, headings which are at the bottom of the page, with the text that follows them on the next page.

A “widow” is a word or sentence isolated at the top of a page (especially an otherwise blank page).

You should try to avoid these, as they disrupt your layout, are unattractive, and can be confusing.

### **3.3.7 Typeface and Size**

Use a standard typeface such as Geneva, New York, Palatino, etc. Avoid using fancy scripts, and use italic or bold type sparingly, for emphasis.

You should use twelve-point typeface. Ten-point is too small to read comfortably, and larger sizes make it appear as if you are simply trying to fill up space.

### **3.3.8 Binding**

Submit your report in one of two types of binding: either use a “duotang” style of binder, or use spiral binding. Do not use the “plastic-spine” binding, as this type of binding creates difficulties for anyone wishing to lay your report open to read it.

## 4. DOCUMENTATION

Proper documentation involves referencing all of your sources clearly. Different professional organizations and corporations have developed their own formats for referencing sources, although most formats include the same information. As a result, you will see a number of different referencing styles in use professionally. *Form & Style* has adopted the IEEE Reference Style, as it is one of the most commonly used in the fields of engineering and computer science.

### 4.1 In-text Referencing

When you quote from or paraphrase a source in your text, or reproduce or adapt a graphic from another source, you must provide a reference. The reference should be indicated by a number in square brackets, such as [n]. This number is then keyed to an entry on the Reference page.

#### 4.1.1 Referencing Quotations

If you quote from a source word-for-word, you must place the words within quotation marks.

Thus, “the quoted words go here” [the reference number goes here].

Note that the reference number is placed within the end punctuation; that is, the period comes after the reference number.

#### 4.1.2 Referencing Paraphrases of Information

If you take ideas or information from a text and put it in your own words, you have paraphrased information. You should not place paraphrased information in quotation marks, but you must still reference your source.

Thus, if the words in this sentence were paraphrased from another source, you should include the reference number at the end of the sentence [the reference number goes here].

Sometimes people wonder how thorough their references should be. As a general rule, if material or information is considered to be in the public domain, you do not need to reference it. For instance, there is no need to reference a source of information for the assertion that water freezes at 0°C; however, if you were taking information from a journal article about a particular experiment that discussed the freezing properties of certain liquids in porous materials, you should reference that information. It is not in the public domain, but rather comes from one source of information.

### **4.1.3 Referencing Graphics**

Graphics need to be referenced just as quotations or paraphrases do. Use the same format: put the reference number in square brackets at the end of the caption (for figures) or the heading (for tables).

You should reference all graphics that you copy from another source; you should also provide references for those that you adapt from other sources, as this is considered a form of graphic paraphrasing.

## **4.2 Reference Page Layout**

Your reference page is placed after your conclusion and before the appendices. It will show reference numbers on the left margin, with the entry on the page next to the number. See Appendix C for a sample reference page.

**NOTE:** If you refer to the same reference entry (e.g., if you refer to the same page or short range of pages in a journal article) more than once in your text, you do not need to give it a new number the second time. Instead, you should repeat the first reference number. If the first reference is [7], then the second reference to the same page(s) of the same source should also be [7]. Both textual references will be keyed to the single reference [7] in your List of References.

### 4.3 Referencing Different Types of Sources

As you know, there are many different sources of information, including books, journal articles, web sites and interviews. Typically, reference entries include authors, titles, and publication information (publisher name and location, date of publication, etc), as well as entries for the relevant page numbers.

This section will present the most common range for source material, and will give examples of how to reference these sources on your reference page. Some of these examples are taken from the IEEE Style Guide web site at [www.computer.org/author/style/refer.htm](http://www.computer.org/author/style/refer.htm).

See Appendix C, "Sample Reference Page."

*A book:*

Gary W. Hansen, *Database Management and Design*, Eaglewood Cliffs, N.J.: Prentice Hall, 1992, p. 45.

*A journal article:*

Jung-Goo Cho, *et al*, "Novel Zero-Voltage and Zero-Current-Switching Full Bridge PWM Converter Using Transformer Auxiliary Winding," *IEEE Transactions on Power Electronics*, Vol 15, No 2, March 2000, pp. 250-257.

*An article in a book:*

A.J. Albrecht, "Measuring Application-Development Productivity," *Programmer Productivity Issues for the Eighties*, C. Jones, ed., IEEE Computer Society Press, Los Alamitos, CA, 1981, pp. 34-35.

*An article in conference proceedings:*

M. Weiser, "Program Slicing," *Proceedings of the International Conference of Software Engineers*, IEEE Computer Society Press, Los Alamitos, CA, 1981, pp. 439-449.

*Thesis:*

Basher Alamin, *Analysis of Construction Loads on Concrete Formwork*, master's thesis, Concordia University, Dept. of Building, Civil & Environmental Engineering, 1999.

*Technical or User Manual:*

*IGBT Designer's Manual*, International Rectifier, El Segundo, CA, 1994.

*Electronic publication (web sites):*

Scott Rosenberg, "Sayings of Chairman Bill," *Salon*,  
<http://www.salon.com/tech/col/rose/2000/05/01/breakup/index.html> (current May 1, 2000).

Faculty of Engineering and Computer Science, Concordia University, "Index-encs,"  
<http://www.encs.concordia.ca>, (current May 1, 2000).

*Interviews:*

Interview with Bill Gates, President, Microsoft Corp., December 14, 1999.

*Newsletter:*

J. Butler, "CASE Outlook," *System Development Newsletter*, Nov. 1987, Applied Computer Research, Phoenix, AZ, p. 3.

*Standards:*

*Recommendation ITU-R BT.601, Encoding Parameters of Digital Television for Studios*, International Telecommunications Union, Geneva, 1992.

*IEEE Std. 1596-1992, Scalable Coherent Interface (SCI)*, IEEE, Piscataway, NJ, 1992.

*Government publication:*

*Heating with Wood -- A Homeowner's Guide*, Cat. No. M27-28/1981E, Canada, Minister of Supply and Services, 1981, p. 3.

*Technical Report:*

*Quadratic Blending Surfaces*, Tech. Report TR-85-674, Computer Science Dept., Cornell University, Ithaca, NY, 1985.

*Personal correspondence:*

Patrick McDonagh, Technical Writing Professor, Concordia University, personal correspondence, May 16, 2000.

## 5. PLAGIARISM

“ Plagiarism” refers to the unacknowledged use of other people’s work, whether this work be in the form of ideas taken without acknowledgment, or sentences copied without documentation. Plagiarism is intellectual theft.

Plagiarism is an offence under the University’s Code of Conduct (Academic). In the Faculty of Engineering and Computer Science, first offences have typically been sanctioned with a failing grade for the course and the requirement to take extra credits in ethics. For more information, see the *Undergraduate Calendar* (62-67).

## 6. SEXIST WRITING

If you write "An engineer's writing skills may determine the success of his career," you are implying that all engineers are male. If you advertise for a "draughtsman," you are implying that all persons who do draughting are male. The use of the pronouns "he" or "his" as generic terms to include both male and female pronouns is not professionally acceptable, and neither is the use of occupational terms which imply maleness exclusively.

The occasional use of "he or she" or "his or her" is acceptable, but their systematic use is awkward and hence should be avoided. Sentences can often be written to avoid the need for the singular male pronoun. Writing in the plural will often work, but you need to avoid creating new problems - remember that a singular subject requires a singular pronoun. For instance, writing "Everybody raised his hand" is sexist, but writing "everybody raised their hands," while not sexist, is ungrammatical, since "everybody" is a singular subject. "They all raised their hands" solves both problems.

## 7. CONCLUSION: SOME FINAL POINTS

Do not do anything to irritate your reader, whether client, employer, journal editor, professor, or assessor. Use the established conventions and follow the particular instructions. If you are uncertain about format or the particulars of style, layout, or some other issue, ask yourself how you can best make the report more accessible to your readers.

And one final point: while following *Form & Style* will help you to produce a good, clear document, you must proofread carefully and edit vigorously. More than anything else, these skills are the keys to good writing.

**APPENDIX A: SAMPLE TITLE PAGES**

*sample title page for ENCS 281*

**Retrofitting the Hall Building  
with Solar Panels**

**by  
Jane Smith  
ID: 5551212**

**A Technical Report  
submitted in partial fulfillment  
of the requirements of  
ENCS 281  
Concordia University  
November 2000**

*Sample title page for ENGR 410*

**Retrofitting the Hall Building  
with Solar Panels**

**A Report  
Presented to  
The Department of Building Engineering  
Concordia University**

**In Fulfillment  
of the Requirements  
of ENGR 410**

**by  
Jane Smith  
ID: 5551212  
Concordia University  
November 2000**

**APPENDIX B: SAMPLE LIST OF FIGURES****List of Figures**

Fig. 1	Butterfly Door.....	4
Fig. 2	Single-Leaf Door.....	6
Fig. 3	Elevator Layout .....	7
Fig. 4	Weather-proofing materials.....	9

**APPENDIX C: SAMPLE REFERENCE PAGE****REFERENCES**

- [1] J. Butler, "CASE Outlook," *System Development Newsletter*, Nov. 1987, Applied Computer Research, Phoenix, AZ, p. 3.
- [2] *IGBT Designer's Manual*, International Rectifier, El Segundo, CA, 1994, pp. 6-9.
- [3] Scott Rosenberg, "Sayings of Chairman Bill," *Salon*, <http://www.salon.com/tech/col/rose/2000/05/01/breakup/index>, (current May 1, 2000).
- [4] Basher Alamin, *Analysis of Construction Loads on Concrete Formwork*, master's thesis, Concordia University, Dept. of Building, Civil & Environmental Engineering, 1999, p. 56.
- [5] Gary W. Hansen, *Database Management and Design*, Eaglewood Cliffs, N.J.: Prentice Hall, 1992, p. 45.
- [6] Gary W. Hansen, *Database Processing with Fourth Generation Languages*, South-Western, Cincinnati, 1988, pp. 12-18.
- [7] Hansen, *Database Management*, p. 57.
- [8] Charles E. Rosenberg, *No Other Gods: On Science and American Social Thought*, Johns Hopkins University Press, Baltimore, 1976, p. 87.
- [9] Alamin, p. 16.
- [10] Charles E. Rosenberg, p. 195.
- [11] Microcell Telecommunications, "Wireless Technologies, and Your Health," Microcell, [http://www.microcell.ca/en/technoparc\\_sante.html](http://www.microcell.ca/en/technoparc_sante.html), (current May 1, 2000).

## APPENDIX D: RULES FOR WRITING NUMBERS

1. Spell out single-digit numbers (zero to nine).
2. Use numerals for multi-digit numbers (10, 11, 12, etc.)

Exceptions:

Always use numerals

1. with a measurement unit or other symbol:

\$3.00, 8.6 cm, 4.30 kg, 8%, 20 g, etc.

2. for numbers that include decimals or fractions:

2.54, 3.1416, 3/4, 0.035, etc.

(include the leading zero for decimal numbers less than one)

3. to refer to a chapter, figure, etc. :

Figure 3, Table 5, Chapter 1, etc.

Always spell out

1. numbers that start a sentence:

Seven years old, but she can already solve differential equations.

2. generalized round numbers:

The 10 students ate about thirty kebabs.

3. one of the numbers when two are consecutive and without punctuation:

ten 100 g samples, four 2 x 4's.

## APPENDIX E: RULES FOR WRITING SI SYMBOLS

In the SI (Système Internationale), there is a unique international symbol for each unit. These symbols are not abbreviations; they are not followed by a period and do not change from one language to another. The following guidelines are based on Metric Commission Canada rules.

1. The symbols are always printed in upright type regardless of the type face used in the rest of the text:

*The room measured 4 m by 5 m, with a ceiling height of 2.5 m.*

2. Symbols are written in lower case, except when the unit name is derived from a proper name:

Thus: m for meter, g for gram, but N for newton, A for ampere. Litre is an exception - the accepted symbol is L even though the system logic requires "l." The lower case letter "l," unless written in italics, is readily confused with the number "1."

Note: When the names of units which derive from a proper name are written out in full, the first letter is not capitalized, e.g. newton, ampere, weber. The exception is Celsius, which takes a capital.

3. Symbols are never pluralized:  
Thus: 1.0 g, and 45 g, (not 45 gs or 45 gms)

4. Names and symbols are not mixed:

Thus: N•m or newton meter, but not N meter or newton m.

5. The symbol is not followed by a period since it is not an abbreviation, except, of course, when it is at the end of a sentence.

6. There is always a full space between the numeral and the symbol.

Thus: 53 g, not 53g. But then is an exception here too. When the first character of a symbol is not a letter, no space is left: 32°C, not 32 °C or 32° C

7. Symbols, not unit names, are used with numerals. When no numerals are involved, unit names are written out.

*Maple syrup is sold by the litre. It takes 40 L of sap to boil down to 1 L of syrup.*

The product of two or more units in symbolic form is indicated by a dot (if possible the dot should be above the line to distinguish it from a decimal point on the line). And use negative exponents, not the slash division sign. Thus: kg•m•s<sup>-2</sup>, not kg-m/s<sup>2</sup>