



Prince Mohammad Bin Fahd University

Electrical Engineering Department

General Guidelines for Writing Technical Reports

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1.0 Recommended Tools

All reports must be prepared using the following computer-based tools:

- Word processor

You should become proficient at using a word processor such as Microsoft Word for such items as page numbers, formatting tables, creating graphs, inserting Greek symbols, and using superscripts and subscripts.

- Equation editor

You should become proficient at using the equation editor (MS Word has a built-in equation editor that can be accessed by “inserting object”). You may also use MathType equation editor.

- Drawing editor

All drawings (diagrams, circuits, etc.) should be done by using tools such as Microsoft Visio, MultiSim or PSpice.

Sometimes, you may need to draw a diagram or a circuit by hand. In these cases, you must use a template/straight edge device such as a ruler. You need to draw everything very neatly.

- Computer spreadsheet software (Microsoft Excel)

Often you will either record data in a laboratory or generate data using a simulation package. In either case, you should use a spreadsheet program to tabulate and conduct further analysis of the data. You can also generate plots easily using Microsoft Excel. Matlab can also be very useful for this type of activity.

- Computer simulation software (Matlab/MultiSim/PSpice/LabVIEW)

At times you will be required to perform simulation of a circuit or a system as part of pre-lab exercises or lab work. You can perform simulations using Matlab, MultiSim, PSpice or LabVIEW which are installed on the laboratory PCs. You can generate results and print out diagrams for your reports using these simulation softwares.

2.0 General Format Guidelines

1. All reports must be prepared using computer-based tools (such as listed above).
2. Every report should have a cover page, including title, your name, course number, department, institution, date, instructor name (with prefix, such as Dr., or Instructor).
3. Use font size - 12, font type - Times Roman or Arial, and line spacing - 1.5.
4. Place page numbers on all pages, bottom right (though title page is page 1, don't display the number 1 on the title page).
5. Equations should be centered and the equation numbers right justified. The equation number should be placed in (). See example below:

$$F(s) = \int_{-\infty}^{\infty} e^{-st} f(t) dt \quad (1)$$

6. If equations are to be referred to in the text, then spell out the word equation followed by the number inside (). Example - "Equation (1) shows the response of a Butterworth filter".
7. Use your word processor to create tables. Center all tables and include a heading and caption with the appropriate table number above each table. For example, "Table 1: Voltage measurements".
8. Figures must be centered, and the figure number and caption is centered beneath the figure. For example, "Figure 1: Circuit diagram of 4-bit Shift Register".
9. A short discussion/introduction must precede all figures/tables. Don't make the reader search for the figures and tables – they should be placed immediately after the paragraph in which they have been discussed or introduced.
10. It is common practice to make reference to all figures/tables by the figure/table #. For example: "The data provided in Table 3 correspond to the test setup of Fig. 1.", or "It is shown in Table 3 ...", or "The results of the transient simulation, given in Fig. 5, show a maximum current of ...".
11. Include schematics/block diagrams of all test circuits and designs. An unfamiliar reader should be able to reproduce your work and must therefore have the circuit schematics/block diagrams.
12. All graphs must be created using a computer tool (i.e., spreadsheet software such as Microsoft Excel or even Matlab.). Do not include hand drawn graphs unless specifically instructed to do so.
13. When you have gathered data for several comparative procedures, then tabulate the final results. Often you are requested to predict the results based on theoretical analysis. Then compare actual results to predicted results. Your table can include a

percent difference analysis between predicted and actual. Sometimes the actual data is that from a hardware test setup, while at other times, it is a result from a simulation. When it is a simulation result, it can still be compared to a predicted result from prior theoretical analysis/prediction.

14. All graphs require labels and units on the axes, and require a legend for more than one set of y-axis data. When graphing discrete measurement data, plot with both lines and symbols (versus lines only) so that one can clearly see what the actual measurements were. If more than one set of data are plotted on the same graph, use different symbols for the data and include a legend which explains the symbols.
15. Include a leading zero when a number's magnitude is less than 1 (use 0.75 instead of writing .75).
16. Include a space between any number and an associated unit (i.e., 2.5 mA, not 2.5mA).
17. Use your word processor for Greek symbols for common engineering quantities as β , π , ϕ , ω , and Ω .
18. Use your word processor to make any necessary superscripts and subscripts. (Use $V = i_2R_2$ instead of $V = i2R2$, or $P = i^2R$ instead of $P = i^2R$).
19. Throw away unnecessary (insignificant) digits and round-off to one or two digits after the decimal point. Use "the measured phase shift was 34.3°", instead of "the measured phase shift was 34.26732°".
20. Use the correct (i.e., IEEE standard) abbreviations for all units. Table 1 shows a list of approved and incorrect abbreviations:

Table 1: Samples of correct and incorrect abbreviations

Parameter	Correct Abbreviation	Incorrect Abbreviation
Volts	V	v
Amperes	A	a
pico (10^{-12})	p	P
nano (10^{-9})	n	N
micro (10^{-6})	μ or u	U
milli (10^{-3})	m	M
kilo (10^3)	k	K
mega (10^6)	M	m
Time	t	T
Farad	F	f
Henry	H	h

21. Place report in a nice plastic binder – see instructor for a sample.
22. If your instructor does not require a plastic binder, then staple it in the upper left corner. Use the large stapler if the report is too large for the standard stapler.

3.0 IEEE Reference/Citation Formatting Guidelines

All sources of information for your report should be cited in the writing.

It is the standard of the IEEE to include a numbered list of references at the end of the paper (but before an appendix) [1]. The list is to be arranged in the order of citation within the text, not in alphabetical order. The reference numbers should be enclosed in square brackets such as [1].

At the end of the report/paper, include a section called References and list each. The titles of books and articles are to be included, as are the page numbers. This is intended to provide convenient means for the reader to locate the cited material. Some examples for various types of reference material are included below. If you do not see an example for your type of reference source, examine any IEEE Transactions journal in the Library for examples.

References

- [1] *Information for IEEE Transactions and Journal Authors*. Institute of Electrical and Electronics Engineers Publishing Services, New York, NY, Sep., 1989, p. 2.
 - example of **data book**:
- [2] *National Operational Amplifiers Databook*. Santa Clara: National Semiconductor Corporation, 1995 Edition, p. I-54.
 - example of **textbook**:
- [3] J.W. Nilsson and S.A. Riedel, *Electric Circuits*. Reading, MA: Addison-Wesley, 5th ed., 1996, pp. 111-113.
 - example of **scientific journal paper**:
- [4] J.W. Smith, L.S. Alans and D.K. Jones, “An operational amplifier approach to active cable modeling”, *IEEE Transactions on Modeling*, vol. 4, no. 2, 1996, pp. 128-132.
 - example of **conference paper proceedings**:
- [5] J.W. Smith, L.S. Alans and D.K. Jones, “Active cable models for lossy transmission line circuits”, in *Proc. 1995 IEEE Modeling Symposium*, 1996, pp. 1086-89.

- example of **Internet web page**:

[6] *Approximate material properties in isotropic materials*. Milpitas, CA: Specialty Engineering Associates, Inc. web site: www.ultrasonic.com, downloaded Aug. 20, 2001.

4.0 Grammar/Writing Style

1. Write the report as if the reader is another person from your peer group—**not** the instructor. Your language should **not** be conversational. It needs to be direct and professional.
2. Do not be wordy! Choose common language and choose your words sparingly. Use **active** voice, not passive. Sentences in **active voice** are more concise than those in **passive voice**.

For some very good instruction and examples, see http://owl.english.purdue.edu/handouts/grammar/q_actpass.html

3. Do not use jargon. Avoid the use of slang or obscure language.
4. Remember that “data” is plural.
5. Use only **third** person (i.e., absolutely avoid using words like “I” or “we” (use “it was found...”, instead of “I found...”))
6. Verb Tense:

Use **past** tense when describing a procedure/process that was implemented in order to produce your results (whether in the lab or using a computer program). For example, “After constructing the circuit of Fig. 1, power was applied.”

Use **present** tense when analyzing the results and making conclusions. For example, “The data shows that the efficiency of the process is 92%.” Also, when making reference to a figure or data within the report, use present tense. For example, “The test setup is shown in Fig. 1.”