

***WRITING WITHIN THE DEPARTMENT
OF NUCLEAR ENGINEERING***

**A Guide for
Nuclear Engineers
and
Radiation Health Physicists**

v1.0 1998

Purpose:

This online booklet of writing guidelines and examples is being made available to all students within the Department of Nuclear Engineering. It is designed to provide a concise summary of the Departmental expectations for writing - at each level in the program (100, 200 etc.). It also includes examples of writing for different types of reports at all grade levels. The guide is meant to be used in conjunction with additional reference texts, such as Hacker's "A Writers Reference" (Bedford's Books of St. Martin's Press, 1995).

Also included in the guide are style requirements for articles in technical journals such as Nuclear Engineering, Nuclear Science, and Radiation Health Physics. Technical journals may differ considerably in their format, and acceptable presentation for one may not be appropriate for another.

Organization

This guide is organized into three sections with a total of seven chapters. Section 1 contains the *Introduction* and briefly outlines the purpose of the guide, how to use the online indexing feature and how to move through the document. The second portion of the document discusses *What Constitutes Good Writing* and provides an overview of the expectations for each grade level. The third section provides specific *Examples* of writing. Examples of typical **classroom** products are presented for each of the levels, 100 through graduate. A chapter on **Business documents** includes sample resumes, memos, proposals, and cover letters. A chapter on *Technical articles* provides instructions to authors from several nuclear-related journals and also includes examples of scientific papers, review articles, editorials, and letters to the editor. Finally, a chapter on *Presentations* provides examples of graphics materials that might be used in talks before a technical and lay audience.


Examples are provided for the following types of writing:

- Classroom assignments:
 - Homework
 - Essays
 - Laboratory reports
- Business documents
 - Progress reports
 - Technical proposals
 - Resumes
 - Memos
- Technical articles
 - Journal
 - Review articles
 - Letter to the editor
- Presentations
 - Technical Audience
 - Lay Audience

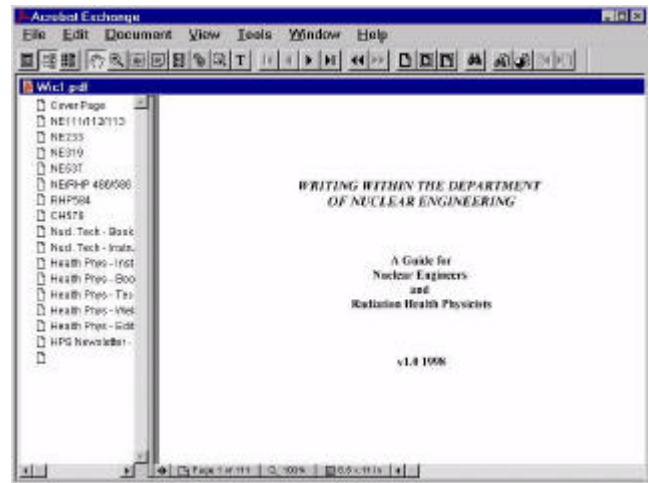
How to use this Guide.

This on-line writing guide has been prepared using Adobe Acrobat® software. The material can be viewed online by using Adobe's free Reader software package. If Reader is installed on your host machine, merely double-clicking on the file will launch the software and open the file for viewing. Once open, there are several items which will make using the guide easier.

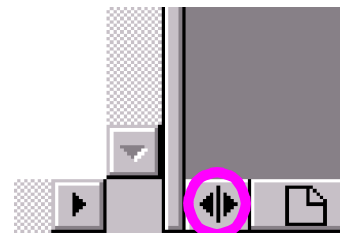
Using bookmarks

Bookmarks are links to specific “pages” of the guide. In order to view the existing bookmark you need to click on the **Bookmarks and page** button () located second from the far left on the tool bar (which is under the menu bar).

The bookmarks will appear on the left side of the screen. Each bookmark is a link to a specific portion of the guide. Click on a bookmark to move to that section.

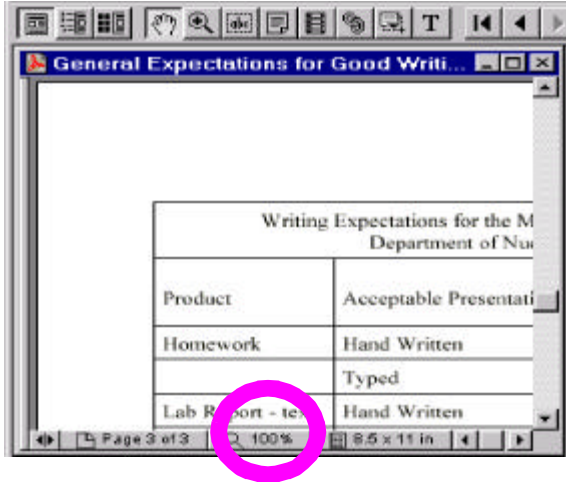


Not all of the text for each bookmark may be visible when it is first displayed. You can adjust the size of the overview window containing the bookmarks by dragging the resizing tool located at the lower right hand corner of the window.



Zooming the viewing area

There are three ways to magnify the viewing area in the PDF document. The first is to select the VIEW command from the menu bar. It will open a list of zoom options for the document. The second option is to select the zoom tool on the acrobat tool bar (the magnifying glass). Drag a marquee (a rectangular dashed line) around the area you wish to zoom in on. Releasing the mouse button will magnify the area. Each click of the zoom tool will double the current magnification (i.e., from 100 % to 200% etc.). The third option is to select a zoom level from the pop-up menu located at the bottom of the document:



In a similar fashion you can decrease the magnification of the viewing area by using the VIEW/ZOOM command or the pop-up menu,

Moving Through the Writing Guide

There are several options which allow you to move through the document. These include using the bookmarks, visible links, and the toolbar. You can also select how the pages will be displayed on your monitor: a single page at a time, as facing pages, or as a continuous stream of pages. Selecting the VIEW command (on the menu line) will pop up a list of options. Choose single, facing or continuous viewing.

There is also a button bar that can be used to navigate through the document. This bar progresses you through the document page by page or takes you directly to the end, or beginning of the guide.



Moving to a specific page. Open the VIEW menu and select the Go To Page option. Enter the number of the page and click the OK button or press enter.

Printing Pdf Documents from Acrobat Reader

Choose Print from the File menu. Enter the number of copies and the page range. Click the OK button to send the document to the printer.

Overview

What is Good Writing?

What is *good* writing?

You are, we assume, reading this text because you want to write “good English” in your reports and for your classroom assignments. But what exactly is “good English”? The English language is very diverse, and acceptable usage may vary depending upon the situation. The goal of this document is to help you become a better writer in general, and an excellent writer in the field of nuclear engineering and health physics.

The basis of good writing in nuclear engineering and health physics is simple communication. Your purpose is to communicate your ideas, opinions, and knowledge. If you write so that others can understand you, then the writing is good. If people cannot understand what you have written, then it is not good writing. It doesn't matter how “correct” the English may be. Spelling, punctuation, capitalization, standard usage are important, but these are secondary to the primary purpose of communication.

So, how do you create “good writing”? Consider the following guiding principles when you write, and the “good” should take care of itself. First, is the writing appropriate to the situation? Second, is it appropriate to the audience? Finally, is it appropriate to the writer?

Writing must be appropriate to the subject and the situation. Are you explaining a topic to a nonscientific audience? Are you attempting to marshall support for an idea? Who are you directing your work towards? Is the subject matter informal or formal? Is it serious, or light-hearted in manner? Treat simple subjects simply, treat serious subjects in a more formal matter. A letter to a friend may be casual, and contain all manner of slang terms. A letter to a potential employer must be presented in a serious and formal tone. [For more information, follow this link to examples of writing appropriate and inappropriate to the subject and situation.](#)



Writing must be appropriate to the reader. You need to adjust the subject matter, content, and presentation of material to suit your audience. This requires understanding their background. In writing class papers, such as essays, it may be difficult to define your reader. One solution is to direct the paper to the level of your classmates (unless otherwise instructed by your professor). This will help define the level of appropriate detail. It will also allow you to determine just “how technical” you need to make the report.

Other things to remember in writing to a level appropriate to your reader:

Clearness - Are the words you are using likely to be in the vocabulary of the person you are addressing? If unfamiliar words are to be used, explain them, or use them in context so that the meaning becomes clear. You should not be attempting to demonstrate your mastery of technical jargon. As scientists and engineers, the use of jargon, unfortunately comes all too naturally. Remember - you are trying to communicate, not confuse.

Correctness - Whether we like it or not we are constantly evaluated by others on how we present ourselves. Is your work presented in a neat, easy to view manner? Spelling is also a large factor in how people judge your work. Take the time to check your spelling. Nothing else leaves an impression like a poorly worded document. Correct grammar is also important. If you use a computer to help prepare written reports, take advantage of the grammar-checking feature that accompanies many commercial word-processing software packages. Otherwise, invest in a style guide such as *A Writer's Reference* (Hacker, 1995).

Here's an easy trick to help check the clearness and correctness of your work. Write the piece and set it aside for a brief period of time (a day or two). Then, reread your work. Does it say what you intended it to say? Did any glaring typographical errors emerge? Another alternative, if you are pressed for time, is to have a classmate review for you. Trade papers! If your classmate stumbles over a piece of prose, then perhaps you should consider rewriting the work.

You may find times when the subject matter requires words that are not appropriate to the reader. A common example is writing about technical issues that are intended for review by a lay (non technical) audience. One solution is to either use simpler words or explain the unfamiliar ones. But be careful! It is very easy to appear arrogant and overbearing when you explain technical terms.

For more information, follow [this link to examples of writing which are appropriate and inappropriate to the audience.](#)



Writing must be appropriate to the author Your writing is an extension of yourself. Use words you are comfortable using. Nothing is more painful than reading, or listening, to an individual who is trying to “sound big” and painfully maiming the language in the process. Listen to others around you. Read from the technical

journals and documents in your field to understand and guide your writing. Reexamine your own work, to understand your good qualities and your limitations. Do you understand all of the words you are using in the text? Do you lapse into slang or trite phrases? How do others in your technical field communicate? Observe, learn, and improve.

Summary Good writing is based on three major principles. It should be appropriate to the subject and the situation. It should be directed to a specific audience. It should be a reflection of the author. If you observe how the English language is used in nuclear engineering and health physics, if you prepare your work to meet the knowledge and background of your audience, and if you are “true” to your self, then good writing will occur. *Good writing is not so much a matter of rules. It is really a matter of judgement, and practice.*

**Expectations for Good Writing
Within
The Department of Nuclear Engineering**

General Expectations for Any Course Material

You are enrolled in a technical field. Your work will be judged on its accuracy and overall presentation. You should strive to present material that is neat, free from spelling and grammatical errors, and is an accurate representation of your own efforts. But what does that really mean? The table below outlines the expectations for work at all grade levels within the department. ***Individual instructors, at their discretion, may request a higher, or lower, standard of work.*** If in doubt about your instructor's expectations, ask!

After you have written your ideas down on paper, what else is important to consider?

- C Spelling - if you are uncertain about the spelling of a word, look it up!
- C Neatness - if your instructor has a difficult time reading your work, imagine how that might impact your grade!
- C Typewritten - in upper division courses, typewritten reports are typically required. Ask your instructor if you are not certain as to these requirements.
- C Computer aided graphs, figures - in upper division courses, software packages are routinely used to analyze data or to run computer simulations. Computer generated output is expected. In the lower division courses you may be asked to demonstrate your facility with a particular piece of software (such as EXCEL[®]) by providing a computer-generated graphic. If you're uncertain, ask your instructor if graphs need to be computer generated.
- C Citations - There are different ways to give credit to someone else's work in your report. One way is through the use of direct quotes. Another is by referencing the document. A third is by including a bibliography. **Please follow the attached link to read more about citations.**
- C Ethics - It is important that the work you present as your own, in fact, is.

Writing Expectations for the Most Common Products in the
Department of Nuclear Engineering


Product	Acceptable Presentation	Course Grade Level				
		100	200	300	400	Grad
Homework	Hand Written	U	U	U	U	U
	Typed					
Lab Report - text	Hand Written	U				
	Typed		U	U	U	U
Lab Report - data	Hand Written	U	U	U		
	Typed, computer graphs		U ^{NE}	U ^E	U ^R	U ^R
Paper	Hand Written	U				
	Typed		U	U	U	U
Resume	Hand Written					
	Typed	U	U	U	U	U
Presentation	No visuals used	U	U			
	Overheads		U ^{NE}	U ^E	U	U
	Slides				U ^{NE}	U ^{NE}
	Computer-Aided				U ^{NE}	U ^E


NE = not expected
E = expected, not required
R = required

Classroom assignments

Work assigned as part of a class may include homework, essays, laboratory reports, presentations, book or journal article reviews and any number of other writing assignments. The expectation for any of these assignments is, at a minimum, they **be legible**. Even in the course of an in-class exam it is to your advantage to write as neatly as possible. This allows the instructor to clearly follow your work and train of thought. In an in-class exam, punctuation, grammar, and spelling are rarely factors (unless previously identified as such by your instructor). All other times the work should be neat, tidy, and as free from spelling and grammatical errors as reasonably can be achieved.

Homework

An example of an *acceptable* homework assignment is shown: 
Note the homework, while handwritten, is neat, logically laid out and includes information such as the student's name, the date, the class and the homework assignment number.

An example of an *unacceptable* homework assignment is shown: 
Note that the homework is not neat, contains several spelling errors, does not include the student's full name, the class number or the date. Also note that the homework is not answered in the order that the questions were asked.

Essays

Many of the classes within the Department of Nuclear Engineering will require some sort of essay - either as part of an exam, or to fill a larger requirement such as submitting a report. An excellent discussion on the particulars of composing and writing can be found in *A Writer's Reference* (Hacker, 1995). The author identifies a checklist which can be used to help get started in the process. An abridged version is given here:

Subject - What exactly will you cover? To what depth? Why this topic?

Sources of Information - Where will your information come from? What type of documentation will be required?

Purpose - Why are you writing?

Audience - Who will be reading this?

Length - Do you have a minimum or maximum length requirement?

Document Design - Are you required to follow a particular format?

Deadline - When is it due, and how can you best budget your time?

These questions may seem overkill for a small one page essay on the nuclear fuel cycle, but if you keep them in mind for every writing project the work will go much smoother, and possibly faster.

Examples of essays from several classes are included below. Do not assume that the format shown in each report is the appropriate one for your assignment for that class. Expectations, format, length, and other requirements may change with the whim of the instructor. If in doubt, ASK!

Example Essay from NE 111/112/113, *Introduction to Nuclear Engineering*

Example Essay from NE 319, *Societal Aspects of Nuclear Technology*

Example Essay from NE/RHP 537, *Applications of Nuclear Techniques*



Laboratory Reports /Project Reports

Several classes in the Department require the submission of laboratory or project reports as part of the course work. It is always important to ask the instructor if a specific report format should be followed. In general the student will be asked to describe the purpose, the methods and materials used in the experiment, the results, and provide a discussion of their significance. The reports may have to be typewritten, depending on the instructor. Examples of laboratory reports from several classes are included below. Again, do not assume that the format shown is mandated for a particular class. Ask the instructor for guidance!

Example Report from NE/RHP 232, *Nuclear and Radiation Physics*

Example Report from NE/RH 486/586, *Radiation Dosimetry*



Business Documents

Writing will most likely be required as part of your job assignment. Typical products can include proposals, reports, executive summaries, memos, technology assessments, etc. Depending upon the organization you will work for, there may be specific style guides for the presentation of all writing - from letters to expense accounts. Some companies have technical editors and secretarial staff to provide assistance in generating a final product. In other instances you may be totally on your own. Make sure you understand the expectations of your employer. This chapter provides an overview on the presentation of common business documents. For a more detailed discussion, see Hacker (1995).

Progress Report

If you are working on a project your employer may request periodic reports as a means to assess progress towards completion, budget status, etc. These reports may have a required format, or you may be allowed to design your own.

Technical Proposal

Technical proposals may be written in response to a specific *Request for Proposal* or may be written “cold”. They will include a statement of the problem to be addressed, an estimated time for completion, a budget, and description of the individuals tasked to work on the project. You may be required to have approval from your financial department prior to submitting the proposal for consideration.

Resume

Resumes can be short (as in a biosketch), long (in order to fully describe the capabilities of the individual), or structured to fit the requirements of the company. Three examples are included here:

Biosketch (a brief paragraph)

Resume (a long description of employment and experience)

C.V. (a structured presentation used in academia)

Memo

These are internal company documents used to convey information, request assistance, or provide explanation. They should be clearly written and professional in tone. Memos may become part of an employees (or company's) permanent record.

Professional Articles

As scientists and engineers you may be asked to prepare technical articles that describe your research or inventions. Typical products can include journal articles, technical reviews, letters to the editor, persuasive arguments and more. Each journal or organization that you submit your work to may have a different style requirement for submission. Make sure you understand the expectations of the journal. In most cases they will not process your work for review unless it meets the stylistic requirements specified. Also, many journals charge for pages. Be sure that your employer, or your grant has the ability to cover these charges in the event the publisher is unwilling to waive them.

Instructions to Authors

We have included three examples from journals commonly used by Health Physicists and Nuclear Engineers. These are:

- Health Physics
- Nuclear Technology
- Nuclear Science and Engineering

Book Reviews

As a scientific or engineering professional, you may be requested to provide a book review for your technical society. Here are examples from three journals:

- Health Physics
- Nuclear Technology
- Nuclear Science and Engineering

Opinion Pieces

You may be asked to write an opinion piece on a technical subject. Here are examples from a technical newsletter and a journal.

- Health Physics Newsletter Opinion Letter
- Health Physics Newsletter Editorial
- Nuclear Science and Engineering Letter to the Editor

Technical Articles

Many companies expect their scientists and engineers to publish their results in the peer-reviewed technical literature. Here are three examples of technical articles:

- Health Physics
- Nuclear Technology
- Nuclear Science and Engineering

Presentations

As scientists and engineers you will be asked to present the results of your research or inventions in a number of different forums. You may be asked to speak to your manager on a technical project, an executive on a concept, the general public on the impacts of your work, or to a technical audience for their review and consideration. There are a number of different formats which can be used to present material. Visual aids such as slides, overheads, or multimedia presentations are common. We have included a brief discussion on the merits, limitations, and considerations of three types of presentations.

Before constructing your presentation you need to be aware of the following:

Subject Matter - What are you going to talk about?

Audience - Is this for a technical audience or the general public?

Time Limit - How much time is allotted for your talk. Generally do not have more than 1 slide or overhead for every 2 minutes of talk, or your audience will be dizzy.

Presentation Requirements - What is the condition of the facility where you will be presenting? Can it handle direct Internet connections? Does it have power? Are slide projectors and overhead projectors readily available?

Slides

When presenting your work at a technical society meeting such as the American Nuclear Society or the Health Physics Society, be aware that these groups may have restrictions on how your material may be presented. The HPS, for example, restricts presentations to either 35 mm slides or poster sessions. Each has stringent instructions on how the material must be presented.

General rules There are several software packages which can be used to prepare the slides. Examples include Powerpoint, WordPerfect, Word, Paintshop Pro, Corel Draw, and others. Several of these packages have standard formats and color schemes for use in constructing 35 mm slide presentations.

Before preparing your work you need to know how the electronic version will be translated into a 35 mm slide. Will you print copies and then have photographs taken? Or will you directly submit the electronic files? At OSU, Photographic Services can directly produce slides from your electronic format. The cost for this service ranges from approximately \$2.50 - \$5.50 per slide, with turn around

times of 1 week to same day service. You can even submit your files over the Web.

In constructing your slide, the text should be readable by you when the slide is held nearly at arms length. If you can read your slide, then your audience can read the projected image. The best colors scheme for slides is a dark background with light colored lettering, for example a blue background with yellow letters. Avoid red lettering as it is not readable from a distance. Make sure that your slide background is not overwhelmed with distracting images. The focus of the talk should be on the words or figures, not the background!

Overheads

Overheads can be constructed from text xeroxed onto transparency film, by printing onto transparency film, or by electronically producing an image onto film. When presenting your work at a technical society meeting such as the American Nuclear Society or the Health Physics Society, be aware that these groups may have restrictions on how your material may be presented.

General rules There are several software packages which can be used to prepare overheads. Examples include Powerpoint, WordPerfect, Word, Paintshop Pro, Corel Draw, and others. Several of these packages have standard formats and color schemes for use in constructing overhead presentations.

Before preparing your work you need to know how the electronic version will be translated into the overhead. Will you print copies onto transparency material, or will you directly submit the electronic files? At OSU, Photographic Services can directly produce overheads from your electronic format. You can even submit your files over the Web.

In constructing your overhead, the text should be readable by you when the overhead is held at arms length. If you can read your overhead, then your audience can read the projected image. The best colors scheme for overheads is a light background with dark colored lettering, for example a clear background with black or blue letters. Avoid red lettering as it is not readable from a distance. Make sure that your overhead background is not overwhelmed with distracting images. The focus of the talk should be on the words or figures, not the background!

Computer enhanced or Multimedia

The increased availability of computers and projection systems has made possible increasingly sophisticated presentations. Music, video, hyperlinks, can all be incorporated into a presentation. But beware, if your computer is down, you may be relegated to giving your talk using chalk and the blackboard. Always have a contingency plan in the event of power failures.

The following examples have been copied from Adobe Acrobat's *Classroom in a Book* (1997).

Sound Clips: This single-page document has a sound bite which is designed to activate when the page is open. This single sentence requires 69 kbyte of space to incorporate into the page.

Movie Clips: This single-page document has a movie clip that requires 2.6 Mbyte of space to run. Make sure that your computer system has sufficient disk space and memory (and speed) if you intend to include many video clips into your presentation. To activate the movie, place the mouse pointer over the volcano picture at the bottom left-hand corner of the document. Double-click to start the movie.

References

Adobe Acrobat, *Classroom in a Book*, Adobe Press, 1997.

Hacker, D. *A Writer's Reference*, Bedford Books, 1995.

Perrin, P.G., *Writer's Guide and Index to English*, Scott, Foresman and Company, Fourth Edition, 1965.