Tips on Reading Assignments for EEPS23000: Mathematical and Computational Earth Sciences (a.k.a. HyperGeoMath)

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1 Contacts

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Some portions of the website are password-protected to ensure that fair use and copyrights are correctly obeyed as I share images from books, etc. You can access these by using:

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username:  io
password:  oceanscience
```

2 Getting Help!

I am usually available by email. Office hours will be Mondays 11-12 or Tuesdays 1-2 or by appointment (see my schedule at `http://fox-kemper.com/contact`). You can also drop into the Math Resource Center (MRC, `https://www.brown.edu/academics/math/math-resource-center`).

3 General Comments on Reading

Before you get worried about reading assignments with homework every week as well, let me explain the thought process behind the reading. You will notice that the reading assignments precede what we will be talking about in class. Thus, I expect you to do a skim-read of the chapters at least *before the class*, so that you can follow along in class.

3.1 Skim Reading: Science

Scientific writing is done in a *very nonlinear* fashion. Generally, a science article is written kind of middle out. The experimental apparatus gets built and described, then the first experimental results are tabulated, then new hypotheses are made, then new equipment is set up for the next experiment addressing these, etc. Then a paper is written which *rejects the chronological order of the experimentation in favor of a logical, systematic ordering.* Why? So that efficiency and clarity are optimized (albeit usually at the expense of excitement).

Many of you have little experience reading scientific material. Good modern scientific writing (like the kind in a few readings I've assigned and the kind you will soon be writing and reviewing) is laid out in a formulaic way, so a busy scientist is able to quickly glean the content without a linear reading from beginning to end. Here's how I do it:

3.2 Scientific Book Reading: Nonlinear Method

1. Read the book title.

2. If I don't understand the book title, read the preface or other introductory materials to figure it out.

3. Read the chapter titles.

4. If I don't understand the chapter titles, read the first and last couple of paragraphs in each chapter to figure it out.

5. Read the section titles.

6. If I don't understand the section titles, read the first and last couple of paragraphs in each section to figure it out.

7. Find the important figures, graphics, definitions, theorems, lemmas, or boxed sets of equations and read their captions.

8. If I don't understand what the these indicate, find the point in the text where they are referenced and read those paragraphs.

9. Read the key concepts outline at the front and back of each chapter if there is one.

10. If I don't understand the key concept listing, find the paragraphs where I can figure it out.

11. Find additional important language and terms being introduced.

12. In all of the above, there will sometimes be keywords or foreign words offset in bold or italics, or repeated technical terms that are unfamiliar. Skim backward and find the first instance they are used (where, if the writer is any good, they will be clearly defined). If they are not defined, look them up online.

13. Read the most important derivations or paragraphs from beginning to end.

14. Read the most important sections from beginning to end.

15. Read the whole chapter/article from beginning to end.

Only when I really need to understand the material, like if I plan to reproduce the experiment described, do I make it to step 11. I usually have done step 4 before I even buy or borrow the book. Before class, I would expect you to do up to step 10. I expect you to have reached step 8 as you enter any journal entries based on this reading assignment. I would expect you to get to step 10 either while writing or revising your paper. I do not expect you to reach step 11 at all, unless of course you really find it interesting.

3.3 Scientific Article Reading: Nonlinear Method

Similarly, when reading a scientific paper, you should (in descending order):

1. Read the title and author list.

2. If I don't understand the title, read the abstract and keywords (if any) to figure it out.

3. Read the section titles

4. If I don't understand the section titles, read the first and last couple of paragraphs in each section to figure it out.

5. Find the important figures, graphics, definitions, theorems, lemmas, or boxed sets of equations and read their captions.

6. If I don't understand what the these indicate, find the point in the text where they are referenced and read those paragraphs.

7. Find additional important language and terms being introduced.

8. In all of the above, there will be repeated technical terms that are unfamiliar. Skim backward and find the first instance they are used (where, if the writer is any good, they will be clearly defined).

9. Read the most important derivations or paragraphs from beginning to end.

10. Read the most important sections from beginning to end.

11. Read the whole article from beginning to end.

Usually, you can get to 5 within a few minutes, and decide if it's worth the effort to go further.

4 An Important Lesson

For those of you keeping track, you'll note that this reading method has a lot to do with the way I suggest you organize writing your homework assignments. If you write like that, others will be able to read like this!