Writing for CS3398

From the Course Objectives:

At the end of the course, the students should be able to:

17. Write technical and non-technical materials for a wide range of audiences:
    - Convey central ideas effectively and critically evaluate sources.
    - Use good structure and logical organization.
    - Use proper mechanics and grammar.
    - Write at a level that is appropriate for the audience.

How does one do that?

Good structure and logical organization:

- A paper has a thesis: a claim, a statement, a central idea.
- Each paragraph has a main idea that supports the thesis.
- Each sentence in the paragraph supports the main idea.
- Bonus: good transition from one paragraph to another
- Problems: using lists to structure the paper, incoherent paragraphs.

Convey central ideas effectively and critically evaluate sources:

- Writing should address the given assignment. For exam/assignment questions, be sure to answer the question that is asked. Address all the aspects of the question.
- Central idea (thesis) must be clearly stated and supported.
- Other (contrary) views should be addressed.
- Use evidence and reasons to support the thesis.
- Understand, explain and evaluate sources (other papers, etc) and use them to support the main idea.
- Problems: not addressing assignment, no central idea or claim, unsupported claims, not using the sources, or not explaining them.

Using proper mechanics and grammar:

- Use words precisely and appropriately.
- Use sentences with good structure, easy for reader to interpret meaning.
- Avoid grammatical errors (spelling, wrong tense of verbs, etc).
- Problems: inappropriate or vague words, awkward sentences, too many words, grammar errors impede understanding.

Writing at a level appropriate for the audience:

- Technical words must be explained and/or defined.
- The depth of the explanations must be appropriate.
- Use examples as needed.
- Problems: Using technical words without defining them, not giving enough explanation.

Different types of writing useful in this class:

There are three main kinds of writing I expect you to be able to employ in this class:

- Summary or paraphrase
- Expository: explain or inform
- Argumentative: state a claim and give reasons to support it

Note: For this class, I am NOT interested in your personal opinions or evaluations!

Summarizing and Paraphrasing:
Both of these involve putting a selection of text into your own words. In both cases it is necessary to attribute your writing to the original source. Summaries include only the main point(s) and are usually significantly shorter than the original. Paraphrases are usually only somewhat shorter than the original passage.

Expository writing:
The purpose of expository writing is to explain or inform the reader. The writer should not assume that the reader has prior understanding of the topic. Some techniques that can be used to organize the explanation are the following:

- Describe the topic by listing characteristics, features, and examples.
- List items or events in numerical or chronological order (and describe!).
- Compare how certain aspects are similar to or different from other familiar concepts (give examples)
- Describe causes and explain their effects.
- State a problem and list one or more solutions.

Argumentative writing:

Most of the material in this section is based on Part I, Chapter 5, of:
Turabian, Kate L. *A Manual for Writers of Research Papers, Theses, and Dissertations*. 7th ed. Chicago: University of Chicago Press, 2007.

Argumentative writing involves stating a claim, and then supporting it with reasons and evidence. This is the kind of writing that is used in academic research, as well as other professional contexts (i.e. trying to convince your manager to use a certain software development process on the next project). It is also often expected in essay questions on tests, for you to demonstrate your understanding of the material and the issues involved.

When employing this type of writing, you should first of all state a claim that may not be accepted at face value by your reader. In fact, you should assume your reader will not accept your claim until they have good reason to, based on the reasons and evidence you provide (this describes perfectly how I read your exams and term papers).

A normal “argument” is a conversation, where someone makes a claim and the other person challenges its validity. The first person gives reasons, provides evidence, and the other person either accepts that or more often challenges it and raises new issues. When you are writing your “argument”, you must imagine the questions and challenges the reader would pose, and address these in your writing. You build your argument around answers to readers supposed questions.

Here are five questions you should answer in order to provide a sound argument:

- What is your claim?
- What reasons support it?
- What evidence supports those reasons?
- How are your reasons relevant to your claim (is the relevance clear)?
- How do you respond to objections and alternative views?

Note that reasons are logical, abstract statements that would be accepted as true by your reader (or will be after you finish supporting them). Evidence is more like data, or hard facts. They need no support.

How do you establish the relevance of your reasons?

Example:
Setting: Michigan at Christmas time.
My sister: "It's 5 degrees below zero (reason), so you should wear a hat (claim)."
Me: "So what if it's 5 degrees below zero, why does that mean I should wear a hat?"
--I am not questioning the truth of the reason, but how it is relevant to the claim.
My sister: "When it's below zero, if you don't wear a hat your ears might get frostbite".
--This is a general principle that I might agree with. If I don't, my sister could refer me to Wikipedia, and/or google "frostbite ears".

A software engineering example:

What is the most appropriate software process model to use to develop a software system to control anti-lock braking in a car?

My claim: The waterfall model.

My reason: The requirements most likely are well-understood and will not change.

First: Is my reason a true statement? Yes, the embedded control hardware and its controlling mechanism is not likely to change. The car and brakes it is applied to also are not likely to change. So the functions/tasks the software needs to accomplish likely will not change.

Second, how is that reason relevant to my claim? The waterfall model is appropriate only when the requirements are well-understood and unlikely to change during development (see the Chapter 2 slides).

Third, what alternate views are there? Here's one: Why isn't something else like incremental development just as good for this situation? We'll discuss this one in class . . . .

"There is no such thing as good writing, only good rewriting." — Louis Brandeis