

Math 2784/2794W

1. BRIEF OVERVIEW

This course will partially satisfy the W criteria for math majors. You are required to prepare a paper of at least 7 to 8 pages of revised and edited work on a mathematical topic this semester, written in accordance with common conventions in mathematics. (Taking the course twice will satisfy the 15-page requirement for a W credit. Under no circumstances will a student be allowed to write two papers in one semester to reach the 15-page minimum for a W credit.) Course handouts are available to provide some sample math papers for you to examine and some advice on mathematical writing. Read the sample papers and model your format on those samples if you are unsure how to structure your paper.

2. WHAT IS A W COURSE?

According to the UConn regulations, W courses should:

- (1) Require that students write a minimum of fifteen pages that have been revised for conceptual clarity and development of ideas, edited for expression, and proofread for grammatical and mechanical correctness;
- (2) Address writing in process, require revision, and provide substantial supervision of student writing. (The structure of revision and supervision may vary, including in-class writing workshops, individual consultation, substantial formative commentary on drafts, and so on.);
- (3) Have an enrollment cap of nineteen students per section;
- (4) Make explicit the relation between writing and learning in the course;
- (5) Articulate the structure of supervision of student writing;
- (6) Explain the place and function of revision in the course;
- (7) Detail how the page requirement will be met;
- (8) Require that students must pass the writing component in order to pass the course.

3. COURSE MEETINGS

Class meetings will be in MSB 319, on Mondays and Wednesdays (I don't expect to have a meeting on Fridays with the whole class). There will be talks scheduled once a week for most weeks of the semester (usually on Wednesdays). You are required to attend at least 7 of these talks, and the paper you write will be based on one of the talks you hear. Even if you select a topic early in the semester, you still are required to fulfill the attendance obligations, which are checked by your filling out and submitting the two-question comment sheet after the talk. At each talk, references to the literature will be made available for further reading about the themes discussed. *Keep these reference sheets together to help you select your paper topic.*

There will be sign-up sheets posted on the instructor's office door (MSB 318) to set up an individual meeting with each student in the early part of the semester.

4. PICKING A TOPIC

How are you going to pick the topic for your paper? The titles and abstracts of the talks can be found at <http://www.math.uconn.edu/mathclub/>, although not all may be available right away. The abstracts (and perhaps to some extent the title) will give an indication of

what the topic is about. After the talk you can search for more information on the topic if you found it interesting, through both the reference sheet for the talk and by a web search. There are a lot of good articles in back issues of the *American Mathematical Monthly*, for instance, which can be found on the website <http://www.maa.org/pubs/monthly.html>.

Inform the course instructor (by email or in person) once you have selected your paper topic. You are encouraged to meet with the instructor to discuss possible topics if you are not sure what to choose. Try to get some substantial background reading done soon after selecting the topic and think roughly about how your paper might be structured. If you find the mathematical techniques needed in the topic you picked to be far above your abilities, then you have chosen the wrong topic! Find a different topic for your paper.

Deadlines for submitting an outline, first draft, and final draft of your paper are as follows:

- (1) Oct. 23rd (Friday after 7th math club talk): Pick a topic
- (2) Nov. 6th (two weeks later): Outline of your paper
- (3) Nov. 20th (Friday before Thanksgiving break): Submit first draft of paper
- (4) Dec. 16th (Wednesday of final exam week): Submit final draft

5. CONTENT OF THE PAPER

The most basic thing to remember is that your paper is about *mathematics*. It must have mathematical content at the college level. A paper with no serious mathematical content is not acceptable. For instance, an essay on the history of the Newton–Leibniz priority dispute over calculus would not be primarily a paper on mathematics and is not going to be accepted. Some historical remarks in your paper can be useful, but they’re not the main point.

It should be evident in the outline you submit what kind of mathematics will be used or developed in the paper, so the instructor can judge that you’re going in the right direction in terms of mathematical content.

A good paper will have the following features:

- An introduction that gives good motivation to the topic.
- Clearly written definitions of relevant terms (which may also be described in less formal language).
- Careful mathematical reasoning that takes the reader from the definitions to some nontrivial mathematical results. This usually is placed in the format of theorems and proofs.
- Examples that illustrate the basic mathematical ideas, including some possible points of confusion. (For instance, $|x|$ is a good example showing a continuous function need not be differentiable.)
- Show a clear mastery of the material.

In short: introduce new ideas with motivation, state results, prove them, and illustrate what they mean by well-chosen examples.

Your paper should *not* contain the following:

- A laundry list of examples, definitions, and theorems with no clear train of thought connecting them or moving in the direction of some goal.
- Two or three equations and otherwise no actual mathematical content. (For instance, a paper on baseball statistics that has only a formula for the standard deviation or a paper on shooting pool that only mentions the angle of incidence equals the angle of reflection. That’s not even college-level math.)

- A persistent vagueness about the concepts being discussed. (It suggests the writer doesn't really have a grasp of the material.)
- A nonstandard tone (autobiographical, poetic, whimsical¹).
- Errors in mathematics, history, or grammar. (Proofread, and don't count on the spellchecker to find all the mistakes on it's own. As you now, some errors are still words.²)

The paper you write should not simply be a repetition of what you heard in a talk. You are expected to do some outside reading and present some of the basic ideas from the talk supplemented by your own expository contribution to show that you have learned something (perhaps some additional examples or a proof which was stated but not explained in the talk, or an alternate proof of a theorem from the talk).

6. WRITING THE PAPER

You may use any word-processing system that can handle mathematical expressions. While not required, math majors considering further study of mathematics after college or honors students who will write a thesis in mathematics are strongly encouraged to use the \LaTeX typesetting system for their paper. \LaTeX is available in the math department (accounts can be provided in the department for students in this course) and this is the system which virtually all mathematicians use to write math papers. This course can provide you with some initial practice with \LaTeX before you have to use it in a senior thesis or later work. A \LaTeX template for a paper and some basic instructions about it are available on the course website. If there is sufficient student interest in learning \LaTeX , a one-time tutorial can be arranged during an officially scheduled class meeting time when there is no talk.

Keep a realistic schedule for the preparation of your paper. It might happen, if you don't pick your topic well, that you find yourself wishing to write about a different topic late in the semester. Contact the instructor immediately if you want to switch topics, so you can discuss the situation and see what your options are.

Most importantly, good writing means lots and lots of rewriting. Proofread your work not only to correct small mistakes but to check that the organization of the material flows well. Could some ideas in the paper be explained more clearly or more concisely? Does the introduction give a proper sense of what the topic is going to be about, or does it sound artificial? Think of the first draft you submit not as the first version of the paper where you have put all your thoughts down in writing, but as the first version of the paper which you are comfortable letting anyone else see.

¹Concerning the use of jokes, follow the advice of Knuth, Larrabee and Roberts: "Humor is best used in technical writing when readers can understand the point only when they also understand a technical point that is being made."

²This illustrates the previous footnote, if you were reading carefully.