MTH 404W Senior Project II

Spring 2014

Class Meets MW 3-3:50pm in MNB 130*

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Office hours† : M, W 11-11:50; F 9-9:50

Materials:
Papers and presentations will be created using LaTeX. There is a compiler on the math network or many are free to download.

Goals:

- To provide a capstone experience for your mathematics major
- To give you a chance to demonstrate your ability:
  - To read and learn mathematics independently
  - To make rigorous mathematical arguments
  - To precisely articulate (both in writing and orally) complicated and technical arguments.
- To have the experience be challenging, but one that you remember with pride and satisfaction for many years
- To have projects worthy of a professional presentation (esp. the Academic Excellence Showcase in May)

Course Structure:
The course will continue to closely model the way in which mathematical papers are written and published by professional mathematicians. The main activities for this term are as follows.

- The referee (in our case, the instructor) has reviewed your paper. The report is either
  - accept the paper as is (rare),
  - accept the paper subject to revision (during this term), or
  - reject the paper (and not pass the first quarter).

*You will also have regularly scheduled weekly meeting(s) with me.

†Please feel free to drop by my office during my office hours for help. You do not need to make an appointment to come to office hours. At times other than my listed office hours you are welcome and encouraged to call or email me with questions about the course. If you have direct scheduling conflicts with my office hours and would like further help, please let me know.

- Revising the paper: Most often, the referee's report is that the paper has merit, but needs improvement. The revision will occur during this term under the direction of the instructor. Regular meetings will continue as needed, and will be increased to two meetings per week during the three weeks prior to your presentation. You will be using a new LaTeX template designed specifically for the WOU Senior Project paper and provided on the website for your final paper. Review the information on the syllabus for last term about audience, style, and so forth. (Corresponds to the revisions a mathematician makes in response to the referee's report received when a paper is submitted for publication in a journal and to reformatting the paper when submitting to a new journal.)

- Speaking about your work: Each person will give a presentation about the senior paper to the class and to the campus. That might occur while the paper is still being revised. The class presentations will be two one-hour lectures. Short lectures will also be delivered at the Academic Excellence Showcase on Thursday May 29. (Analogous to the professional mathematician speaking about ongoing or completed work at colloquia and meetings.)

- Reporting and Feedback : At each weekly meeting, you will submit a written work log, summarizing times worked and what was accomplished during each work period. Enhanced reports also include questions, comments, ah-ha moments and so forth. You will be expected to come to the meeting prepared to orally summarize your work for the week and give reports on any difficulties or triumphs experienced during the week. Most weeks you will bring an updated draft of your paper. At the end of each meeting an agreed upon course of action to be completed before the next meeting will be decided upon. At the next meeting we will together evaluate your progress and you will receive a grade based on both your work log, draft progress, and adequate completion of the assigned tasks. Such reports are a common practice in some jobs and for some grant funded work. Here they count as part of the grade. A minimum of 6 hours per week is expected, but that will not be sufficient for most weeks.

- Submitting your final paper: After that lengthy process of writing and review, you will submit the paper at the end of this term. Then, in the jargon of scholarly publication, it will be "refereed." The version you submit should be one which you think needs no more work. Your final paper is due by 5pm on Thursday June 12th.

- Taking the ETS Major Field Test on _____. (Analogous to qualifying exams in graduate school or to professional exams such as the actuarial exams. More importantly, the exam is part of mandatory ongoing assessment of the effectiveness of the math department. We rely on you to prepare for the test and to do your very best work on it in order to give an accurate assessment datum.)

- Completing an exit interview with a faculty member of your choice before the end of the term. (Also part of departmental assessment.)

Guidelines for speakers:

- From your topic, develop a subtopic into a class presentation from which all the participants can learn something interesting and worthwhile. Begin discussion of the outline of the

presentation with the instructor at least three weeks before you begin presenting. You should initiate the meeting with the instructor.

- Pay attention to the criteria in the rubric (you will receive a copy).
- Deliver the presentation along with appropriate (brief) homework or other assessment activities of your choice. In partnership with the instructor, you will grade the homework or assessment activities. The point is to help the listeners learn and to allow the speaker to see what was learned.
- Some portion of your presentation should use Beamer (this is the LaTeX version of powerpoint). A template will be provided on our class webpage.
- Write *much* more on the board than you think you should. You can speak much faster than the audience can process and absorb what you are saying. Writing helps to control the pace, besides allowing the audience to refer back to a definition or theorem.

  Beamer makes for professional looking presentations. However, proofs are not effectively done with those tools because they go too fast for the reader to absorb or to take any notes, and are generally to long to fit on one slide.
- Use handouts as appropriate. They can be copied by the math department if you give them to the instructor in advance.
- Rehearse, rehearse. That is the only way to ensure that you have the proper amount of material and that you present it clearly.
- Think of ways to involve the audience in active learning.

Guidelines for listeners: Participate actively in the presentations of others by asking and answering questions, making (appropriate) comments, and doing the homework/activities provided by the speaker. I will keep a "Participation Log."

Grading:

Class presentation	38%
Presentation outline discussed with instructor	-1% per day, if late
Participation in the presentations of others	5% of the grade
Senior Paper/Thesis	38% of the grade
Weekly Meetings	10%
ETS Major Field Test	9%
Exit Interview	Mandatory for a passing grade.

A student who feels s/he may need an accommodation for any type of disability should make an appointment to see the instructor or contact the Office of Disability Services (AP 405, 838-8721 v/tty).

Schedule:

- Day 1 Set up regular meeting times with instructor. Meetings will be ongoing throughout the term.

- Weeks 1-2 Review for major field test (class will be held). It is expected you will work on and present practice problems to the class. Specific assignments and deadlines will be posted on our class website.
- Week 3-8,10 Presentations – Attendance and participation is mandatory.
- Week 9, Thursday May 29th, Academic Showcase Presentation
- Finals week – Paper due 5pm Thursday.

Appropriate Classroom Behavior: You are ultimately responsible for your own attendance and performance. It is expected that electronic devices such as cell phones will be turned off during class. Proscribed Conduct for all students is described in the University Catalog.

Incomplete Policy: An Incomplete can only be granted for a student who is passing a class and has a documented emergency that prevents them from completing a small component of the course.

Accommodations: Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office of Disability Services at 503-838-8250 to coordinate accommodations. Students needing medical or mental health care can access the Student Health and Counseling Center by calling 503-838-8313, emailing at health@wou.edu, or by walking in to schedule an appointment.

Veterans and Active Military Personnel: Veterans and Active Military Personnel with special circumstances are welcome and encouraged to communicate these, in advance if possible, to the instructor.

Guidelines for Authors of Senior Papers

As is the case in the working world of mathematicians, including teachers, these guidelines are enforced.[‡]

Content and Audience

The senior paper/thesis/project is be an original treatment of material from multiple sources, properly cited. "Original" means it will be presented in the author's own words, which are not overly bound to the style of the sources. In some cases, it may contain original mathematics. It should always contain original examples. All proofs omitted from the source work should be completed, if possible, in the paper, either in the body or in an appendix.

The paper should be sufficiently self-contained and clear as to be accessible to an average senior mathematics major at WOU.

Style

A senior project template has been developed for WOU senior projects. A link to the template is our on our class webpage. You are expected to follow the style of the template including the style of the references.

Writing

The senior paper is a reflection on you as a mathematician and scholar. It is expected to unusually well-written with good sentence structure; easily understood and mature writing style; correct spelling, grammar and punctuation; and smooth transitions. Refer to a standard manual for matters of grammar and punctuation.

Authors should read the following for math-specific writing advice.

L. Gillman, *Writing Mathematics Well: A Manual for Authors*, Mathematical Association of America, 1987. A short, readable guide about writing proofs for publication, but much of it applies to all mathematical writing.

K. P. Lee, *A Guide to Writing Mathematics* accessed 16 September 2005 at `http://ems.calumet.purdue.edu/mcss/kevinlee/mathwriting/` or available in hardcopy from Mike Ward. Seventeen pages of practical advice with examples. Highly recommended.

Typing

LaTeX references are listed on the website. Assistance in learning LaTeX is available upon request.

[‡]For example, in a workshop on grant writing at the Joint Mathematics Meetings in January 2007, it was reported that a very large number of grant applications to major funding agencies like the NSF are never read because guidelines are not observed. Even small things like improper margins can disqualify a proposal. (This anecdote courtesy of Professor C. Beaver.)