Math 505: Analysis for Teachers – Fall 2008

Instructor: Heather Finotti
Office: Ayres Hall 303
Phone: 974.4302
e-mail: `heather@math.utk.edu` (this is my preferred means of communication)
Office Hours: see website

Course Web Page: `http://www.math.utk.edu/~heather/505Math.html`

Course Packet: "Honors Calculus" by Dr. William Wade

Lectures: W 5:45-8:35pm, Ayres 209A

Midterms: (TENTATIVE) October 1 and November 5

Final: December 10 (Wed), 7:15-9:15pm.

Grade: 20% for homework (written), 10% board work, 5% quizzes,
20% for each midterm, 25% for the final.

Course Information

In this course you will be introduced to Real Analysis. The main purpose is to deepen your understanding of Calculus of functions defined on the Real numbers. The hope is that with a deeper, more precise perspective, you will not only understand the subject better yourself, but more easily and more completely communicate that understanding to your students.

As in any higher level math course, part of the objective is also to further develop your ability to analyze, formulate, write, and orally present mathematical proofs. Why could this be useful to you? As Dr. Wade states in his "Intro to Abstract Math" text, the reasons could fill a book. In my opinion, one of the most important reasons is also stated in that text - "We are easily fooled!". Learning how to think carefully, precisely, and logically is not just useful for writing mathematical proofs. If you learn to let the rigor of thought you get from this course seep into other areas of your life, it could help you get a clearer grasp on what really is true and what is not, regardless of the context.

Not that everything can be discerned through logic :) - I don't want to overstate my case. But hopefully we'll come to be less easily fooled. In my opinion, one of the best things any students can learn from mathematics is better critical thinking. The more deeply the teacher carries the qualities of rigorous thinking and communication, the more the student can model it from the teacher.

Please let me know if you feel that you may not have an adequate background for success in this course, or if you have not met the course prerequisites with at least a 'C' grade.

Expectations Summary

1. Read sections that we will be covering before coming to class. You will be quizzed over the definitions in your reading.

2. Active engagement during class - I **expect** you to ask questions during class, and that you

are actively thinking about what is being presented.

3. Homework will be due daily at the beginning of class and problems will be posted on the website. Late homework will not be accepted, so the lowest two scores will be dropped.

4. Check your email and the website frequently. I will be using email to send out announcements about the course.

Course Structure and Definition Quizzes

The tentative day-by-day course structure is on-line at

http://www.math.utk.edu/~heather/505Fall08Calendar.pdf,

and will be updated regularly (it's better to check this regularly on-line than print it out – it is likely to change fairly often). Here you can see what sections will be covered in lecture each day and when the exams will be held.

I will expect you to read over each section **before** coming to class. There will be 10 random **definition quizzes** held during the semester. Definitions are the foundation of everything we'll be doing in this course, and it's nearly impossible to prove something without first knowing the definitions of the objects involved in the statement you are trying to prove. I will expect the definitions to be absolutely correct. Each definition will be graded out of 2 points: 2 for entirely correct, 1 for partially correct, 0 for completely incorrect. The lowest two quiz scores will be dropped.

On most class days, you will be expected to present homework problems in class, on the board, rather than turn them in. These presentations will also be part of your grade. Board presentation days will work in the following way: You will hand in a 3x5 card with the numbers of the problems that you have solved. For each problem to be presented, I will choose a card at random and that person will present their solution on the board. You will receive one point for each problem that you claim, if you present an incorrect solution you will lose the point for that problem, and if you bluff (meaning you claim to have a solution, but do not actually have one) you will lose 20 points. The lowest two boardwork scores will be dropped.

Homeworks

Homeworks will be posted on the course homework page at

http://www.math.utk.edu/~heather/505Homework.html

and will not be announced in class. I will be assigning problems the day after each class day which will be due the following class day. For your homework write-ups, I ask that you adhere to the following instructions:

1. The first page should have only your name, **the names of the people with whom you worked (if any)**, and the number of the homework set. Please **do not** write this information on any other page. (The purpose of this is grading anonymity.)

2. There should be no more than **two** problem solutions on one side of a piece of paper. Please feel free to use both sides of the paper.

3. Each solution should begin with the problem chapter, number, and original problem statement (for a problem in chapter 4, say number 12, you could just write 4.12 if you'd like). Your handwriting should be easily readable (and not just by you :), by any random average English-literate person).

4. **Thorough** explanations and correct use of notation are expected in your proofs and exercises. An answer alone is never a complete solution, as work/explanation should always be included. Complete sentences and good grammar are expected! Exposition is important in mathematics too. Most of all, make sure that you check yourself for complete, logical arguments (look for gaps in reasoning, missing justifications, etc).

5. Working in groups on homework sets can certainly be beneficial, and I encourage you to form study groups, however you must do your final homework write-ups on your own and in your own words. Consider this the real test **for yourself** of whether or not you understand. **All collaboration or outside help must be acknowledged**. Plagiarism in any form will not be tolerated.

6. **Staple** all of your solutions together before turning them in.

Late homework will not be accepted. The reason that I will drop the two lowest scores is exactly to account for students needing to miss a due date for reasons of sickness, family emergency, etc. If you end up in a situation where a single illness is going to cause you to miss turning in more than 2 assignments, contact me.

It is your responsibility to keep all your graded homework and midterms. It is very important to have them in case there are any problems with your grade.

Definitely **come to my office hours** if you are having difficulties with the course – this is what they are for. Please try to come during my *scheduled* office hours, but feel free to make an appointment if that would be impossible. You can also email me with questions.

E-Mails

You will have to check your e-mail at least three times a week, preferably daily. I will use e-mail (given to me by the registrar's office) to make announcements. I will assume that any message that I send via e-mail will be read in two days or less, and it will be considered an *official* communication.

Due to privacy issues, I cannot send grades via e-mail, unless you sign a document saying that you are aware that e-mails are not secure and not necessarily private. (In fact, because of the open records laws in Tennessee, it really is not private.) If you want to sign such a document, please let me know. Grades for midterms will generally be posted on the course blackboard site, however.

Feedback

I have an *On-line Feedback Form* at

$$\text{http://www.math.utk.edu/~heather/php/feedback.html}$$

where you can anonymously send me your comments and suggestions. I will consider your comments and try to do whatever I can to resolve possible problems before it is too late. So, please, feel free to use it whenever you have any constructive comments or suggestions. (In fact, I would greatly appreciate it.)

Legal Issues

Conduct. All students should be familiar and maintain their "Academic Integrity": from *Hilltopics 2007/2008* (`http://web.utk.edu/~homepage/hilltopics/HILLTOPICS2007-08.pdf`) pg. 40:

> ### *Academic Integrity*
>
> *The responsibility for learning is an individual matter. Study, preparation and presentation should involve at all times the student's own work, unless it has been clearly specified that work is to be a team effort. Academic honesty requires that all work presented be the student's own work, not only on tests, but in themes, papers, homework, and class presentation. There is a clear distinction between learning new ideas and presenting them as facts or as answers, and presenting them as ones own ideas.*

You should also be familiar with the "Classroom Behavior Expectations" found at

`http://www.math.utk.edu/Undergraduate/undergrad/Expectations.pdf`.

Disabilities. Students with disabilities that need special accommodations should contact the "Office of Disability Services" (`http://ods.utk.edu/`) and bring me the appropriate letter/forms.

Sexual Harassment and Discrimination. For *Sexual Harassment* and *Discrimination* information, please visit the *Office of Equity and Diversity* at `http://oed.admin.utk.edu/` and check

`http://oed.admin.utk.edu/docs/complaint_sex_harass.pdf` (Sexual Harassment)

`http://oed.admin.utk.edu/docs/DiscrimCompProc.pdf` (Discrimination)