MATH 453 – FALL 2006 – GENERAL INFORMATION

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  Web page: `http://www.math.cornell.edu/~tsh/453.html`

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Lectures. TuTh 14:55–16:10 in 207 Malott.

The Course. Topology is a major component in the foundation of many areas of modern mathematics. It is a qualitative version of geometry. If we can continuously morph one object into another, than as topologists, we view them as the same. For example, we may smush a square to become a circle and so they are equivalent. On the other hand, a Y is different from an X, because there is a point in the X that when removed leaves four pieces. The Y has no such point.

The bulk of the course will focus on point-set topology. This part of topology explores set-theoretic ideas that are important to all areas of mathematics, particularly analysis. We will define topological spaces, discuss open and closed sets, connectedness, compactness, quotient spaces, and surfaces. If time permits, we will begin to explore algebraic topology. Algebra has been an invaluable tool in twentieth century topology. We will see how what certain algebraic invariants can tell us about topological spaces. No prior experience with algebra will be assumed.

Textbook. The course text book is *Lecture Notes on Elementary Topology and Geometry*, by I.M. Singer and J.A. Thorpe. This textbook is rather terse. I expect we will spend about two lectures per section, spelling out all of the details. We should cover the first two chapters completely, make a detour to classify surfaces, and then finish off with part of all of the third chapter, as time permits.

There are many other good topology books out there. Whenever you feel stuck or confused with our text, please feel free to consult alternative treatments. Reading multiple accounts of one topic is often helpful. Some other texts you might consult include

(1) *Topology* by J. Munkres, and
(2) *Topology: An Introduction to the Point-Set and Algebraic Areas* by D. Kahn.

These books are on reserve at the Mathematics Library.

Warning: There will be some correlation between our text and the lectures, but we will cover material that is not in the book, and we may do some things differently. *What matters for the exams is what material is covered in lectures and in the homework!*

Academic integrity. As always, you are expected to abide by the Cornell Code of Academic Integrity. This states, "A Cornell student's submission of work for academic credit indicates that the work s the student's own. All outside assistance should be acknowledged, and the student's academic position truthfully reported at all times."

Homework. There will be two types of homework in this course: **problem sets** and **extended glossaries**, with no more than one per week. Assignments will be handed out on Thursday, and will be due the following Thursday. There will not be homework during weeks when there are exams. All handouts will be available on the web at

<center>http://www.math.cornell.edu/~tsh/453.html</center>

There will be approximately six problem sets and six extended glossaries. Your lowest grade for each will be dropped when computing your final homework grades. **No late homework will be accepted.**

Problem sets will be handed out about every other Thursday, and will be due the following Thursday. For the most part, these will consist of statements you will need to prove (or disprove).

Extended glossaries need a bit more explanation. For these, you should give a definition of the **term of the week**, give an example and a non-example (different from those given in the book), and state a theorem that uses the term. I expect these should be a page or two long, depending on how small your writing is. They should be written formally – so that we could cut and paste them into a textbook. By the end of the semester, you will have a compendium of important terms and examples.

You may work together on your assignments, and you are encouraged to do so. However, you must write up your final solutions **by yourself**. Your work must be written neatly and legibly. Proofs should be written in complete English sentences. Your homework score will be determined not only by the correctness of the responses, but also by the correctness of the grammar.

Exams. There will be two prelims and a final exam. These will all be take-home exams: you will be allowed to consult your text and your course notes, but you should not discuss the exam with your fellow students. You will have one week to complete each prelim, and you will have a week and a half for the final exam. The exams will be handed out on the following dates.

> First Prelim: Thursday, September 21, 2006.
> Second Prelim: Thursday, October 26, 2006.
> Final Exam: Tuesday, November 28, 2006.

Warning: There will be no make-up exams, except in extreme circumstances. In the rare case that a make-up exam is granted, it will be an oral examination.

Grading policy. The course components will be weighted as follows:

> Problem sets – 20%
> Extended glossaries – 20%
> Each prelim – 15%
> Final – 30%

If you have questions about homework, exams, or grades, please come talk to me during my office hours or send me email.