

# MATH 461 - Topology

## Spring 2013

Instructor: Casey Douglas  
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Coffee Hours: T 2:00-3:00, Tr 3:00-4:00, F 10:00 - 11:00  
and by appointment

TA: Nick Pasko ([nrpasko@smcm.edu](mailto:nrpasko@smcm.edu)), 443-866-8062  
TA Hours: M 7-8pm (ish) in the Fish Bowl



“Point set topology is a disease from which the human race will soon recover.” – ????

“If it’s just turning the crank it’s algebra, but if it’s got an idea in it, it’s topology.” – ????

“One must always topologize.” – ????

### Course Content

This class will explore both classical and current areas of topology. Much of your time will be spent on the former, which often goes by the name of Point Set Topology. That being said, we will have occasion to discuss and pursue various other topics. These include (but are not limited to) applications of topology, algebraic topology, geometric topology, homology and cohomology, functional analysis, knot theory, and graph theory.

### Textbook

*Topology* by St. Mary’s College of Maryland 2013 Topology Class. (A draft of this book is available on our course website.) By the end of the semester we should have a complete book!

### Course Resources

Naturally, you have written resources to help you with the course material, some pre-existing (your textbook and any class handouts) and some that you will produce as the course progresses (your homework and notes). Arguably the most important resources at your disposal are people.

First and foremost you have each other. In fact, the class will complete the unfinished textbook mentioned above; this is our class’ primary goal. Virtually all of the proofs are missing, and it is our job to have every gap filled in by the end of the semester. You are encouraged and expected to work on problems with others. Secondly, you have the wonderful Nick Pasko as your TA. Lastly, you have me. Please make use of our office hours and review sessions.

It is important to keep in mind that you are *not* allowed *any* other resources. No other textbooks, websites or people may be consulted this semester (unless I give permission). Please consult the end of this syllabus which contains a legally binding contract.

### **Assignments**

There will be two different types of assignments in this class: problem presentations and written assignments. You will be expected to present homework problems on a regular basis, and these presentation grades feature three components: (1) Accuracy (2) Clarity / Discussions (3) Creativity. Productive exchanges with your classmates about the correctness of your solutions count towards the second category, while ideas for generalizations or related conjectures count towards the third.

Every two weeks you will be required to hand in 3 written solutions. You are required to typeset these assignments using TeX (or something similar), and at least one of these solutions cannot have been previously presented in class (unless you were the presenter). You are allowed to choose the three problems you would like to submit, so play to your strengths! The only restriction is that the selected problems must come from a chapter and/or material we are currently working on.

The vast majority of the problems you will be presenting and writing up are found in our incomplete textbook. I will also assign additional problems as the semester progresses, however. Keep in mind that the textbook questions comprise the foundation for this class, so be sure to prioritize them.

### **Grades and Tentative Exam Dates**

Grades will be computed as follows:

- Presentations: 45%
- Written Assignments: 35%
- Midterm: 10%
- Final: 10%
- Class Average: ??

I will keep track of the class' average presentation grade throughout the semester. If this average grade is high enough, I will let it replace your midterm or final exam grade (and/or I will let it benefit you in other ways).

### **Students with Disabilities**

Any student with a disability requiring accommodations in this class is encouraged to contact me. Students with a disability may also wish to contact Lenny Howard in the Office of Academic Services.

**Contract** Welcome to Math 461! This course will probably be very different from most other math courses that you have taken. We are going to be following a (modified) method of learning mathematics made famous by the mathematician / racist R. L. Moore. The hallmark of this method is that the students (you!) are responsible for creating most of the mathematics discussed in the course.

The core of the course will be our incomplete textbook which contains definitions, theorems to be proven, and problems to be solved. Here are the rules for this class.

1. Problems and Theorems should be viewed as *conjectures*. They may be either true or false. They can be solved by rigorously showing which category they fall in. If the problem or theorem is not correct as stated, you should try to see if there is a way to fix it.
2. Solutions and proofs should be presented to the class *on a regular basis*.
3. Productive, civil discussions amongst the class is expected. Rudeness will not be tolerated, so be sure to raise objections clearly but tactfully. Be respectful of your fellow classmates, both when you are presenting and when you are being presented to.
4. You may discuss the problems you are working on with other members of the class as long as neither of you has already solved the problem. If you have solved a problem you can try to help another student arrive at the solution themselves, but you MAY NOT simply give them your solution.
5. The only texts that you may consult are the official course notes / incomplete textbook and your own notes. You should not consult any textbooks unless I have specifically given you permission. Solutions to some of our problems can be found in other books and on various websites, but if you consult these resources you will be depriving yourself of the understanding that will come from solving the problems on your own.

I \_\_\_\_\_ agree to the rules and restrictions outlined above. If I am found guilty of violating any of them I understand that I may be penalized with an automatic F for this course and agree to purchase LEGO sets for Dr. Casey Douglas.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_