

Topology (Math 460) Syllabus

Fall 2009

Contact Information

Professor: Chris Camfield Office: 309-A Hayes Hall
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Web page: <http://www2.kenyon.edu/Depts/Math/Camfield/>

Office Hours: Tuesday 10:00 – 12:00
Thursday 10:00 – 12:00, 1:30 – 2:30
Additional times by appointment

Office hours are for your benefit, and you are encouraged to take advantage of them. If you are unable to meet during the posted times, please feel free to contact me. I will happily try to find a time to accommodate you.

Course Information

Classroom: 203 Hayes Hall

Time: Monday, Wednesday, Friday 2:10 – 3:00

Course web page: <http://www2.kenyon.edu/Depts/Math/Camfield/460f09.html>

Required textbook: *Introduction to Topology: Pure and Applied*, by Colin Adams and Robert Franzosa.

Software: We will use *Maple* in class. I will assume no prior knowledge of the program and teach what you need to know as we go. Free student copies of *Maple 13* for your personal computer are available from Professor Klopčič in 101 Hayes Hall.

Course Description

Topology is a relatively new branch of geometry that studies very general properties of geometric objects, how these objects can be modified, and the relations between them. Three key concepts in topology are compactness, connectedness, and continuity, and the mathematics associated with these concepts is the focus of the course. Compactness is a general idea helping us to more fully understand the concept of limit, whether of numbers, functions, or even geometric objects. For example, the fact that a closed interval (or square, or cube, or n -dimensional ball) is compact is required for basic theorems of calculus. Connectedness is a concept generalizing the intuitive idea that an object is in one piece: the most famous of all the fractals, the Mandelbrot Set, is connected, even though its best computer-graphics representation might make this seem doubtful. Continuous functions are studied in calculus,

and the general concept can be thought of as a way by which functions permit us to compare properties of different spaces or as a way of modifying one space so that it has the shape or properties of another. Economics, chemistry, and physics are among the subjects that find topology useful. The course will touch on selected topics that are used in applications.

Prerequisite: MATH 341 or permission of instructor.

Course Procedures

Attendance:

Attendance at each class period is expected, but will not be graded. In the event of an excused absence (such as an athletic or other activity approved by the Dean of Students and the Dean of Academic Advising and Support), you must contact me in advance to make the appropriate arrangements. In the case of an emergency or illness, you need to first contact the Dean of Students. In the event of an absence, you are responsible for the material discussed during the missed class. You should check the web page and/or talk to a classmate to find out what you missed. While I am happy to answer questions in office hours, I will not repeat entire lectures for absent students.

Homework:

Homework problems will be assigned regularly consisting of problems from the text and created by myself. Homework will be collected at the *BEGINNING* of class on the day it is due, and late homework will not be accepted. Extensions may be granted at my discretion, but must be discussed with me in advance. If you will miss class due to an excused absence (see section on attendance), please notify me in advance if possible.

You are expected to turn in neat and legible homework with problems and answers easily identifiable (neatness will factor into the grade). Explanations are to be written in complete sentences.

Homework assignments will usually be posted on the course web page after being assigned. *The classroom announcement serves as official notification of assignments.*

Exams:

There will be two take-home midterm exams and one in-class final exam, all of which should be considered comprehensive. The midterm exams will focus on the most recent material, but the nature of how the course builds upon itself makes all of the material relevant. Midterms will be given to you on a Wednesday and are due the following Friday. You are not permitted to consult with anyone except Professor Camfield about the midterm exams until after they are due. Books, notes, computers, and calculators are not permitted for use during the final exam.

Class Lecture:

Effective communication is an important goal of this class, so each student will be responsible for giving one lecture to the class. You will need to meet with Professor Camfield in advance to plan a topic and date for your lecture. **Topics covered in student lectures will be on the exams**, so be prepared to answer questions from your classmates. Your lecture must last between 40 and 45 minutes. You are free to choose the format of the class (blackboard talk, powerpoint, lab activity, etc.). You will be evaluated on

- Accuracy and completeness of content
- Presentation and organization
- Staying within time constraint
- Ability to field questions from class

Assessment

Your final course grade will be based on the following components and corresponding weights.

Homework	20%	Exam 1	20%
Class Lecture	10%	Exam 2	20%
		Final Exam	30%

General Classroom Policies**Participation:**

Classroom participation is encouraged and may factor into your final grade in borderline situations. There will be numerous opportunities to speak in class and present work in front of the class. Mathematical dialogue between students and the professor will be a regular part of class. Questions and comments are encouraged during class.

Computers and Cell Phones:

A laptop computer will be provided for each student to use while in class. These computers are not to leave the classroom. While class is in session, the computers are only to be used for class activities. If you show up early, you are free to use the computers for personal reasons before class starts. Cell phones need to be in silent mode during class (preferably off). Text messaging during class is not permitted.

Email:

Official class announcements will only go to your Kenyon email address. Check it often.

Academic Honesty:

In general, the rules set forth in the 2009-2010 Course of Study apply. Presenting the work of others as your own is strictly prohibited. In the case of homework, you may collaborate with others in discussing how a problem may be solved, but your write-up must be your own. If you submit work that contains the ideas or words of someone else, then you must provide proper citation. Assistance cannot be given nor received (other than by the instructor) on any quiz, or exam associated with this course, except where explicitly allowed by the instructor. For further information, consult your instructor.

Disability Accommodation:

If you have a disability and feel that you may have need for some type of academic accommodation in order to participate fully in this class, please feel free to discuss your concerns with me in private and also contact Erin Salva, Coordinator of Disability Services at extension 5453 or via e-mail at salvae@kenyon.edu.

Tentative Course Schedule

The core course material will be chapters 1-7 of the textbook. This collection of material is known as point-set topology.

Chapter 1: Topological Spaces

Chapter 2: Interior, Closure, and Boundary

Chapter 3: Creating New Topological Spaces

Chapter 4: Continuous Functions and Homeomorphisms

Chapter 5: Metric Spaces

Chapter 6: Connectedness

Chapter 7: Compactness

Additional material will be determined later depending on time remaining and the interests of students in the class. Topology is a very broad subject that is useful in all areas of mathematics. I look forward to getting to know all of you better and finding out what interests you.

Exams will be on the following dates:

Exam 1 Wednesday, September 30th (Due Friday October 2nd)

Exam 2 Wednesday, November 4th (Due Friday, November 6th)

Final Exam Monday, December 21st, 6:30 – 9:30 pm*

*The time and date of the final exam is set by the Registrar's Office and cannot be changed. Family vacations and work schedules are not sufficient grounds for special accommodations.