Set Theory & Topology   Noon MWF   Spring 2020 (Revised)

Instructor:	Jonathan White
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Office:	Stuart 311
Office Hours:	by appointment
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Text:	*Introduction to Topology*, Crump Baker and *Principles of Topology*, Fredrick Croom
Participation:	Successfully presenting an exercise will earn 1 point. Occasional quizzes will earn up to 2 points each. Unexcused absences deduct 5 points. Up to 250 points are possible.
Problem Sets:	Several problem sets will be assigned through the term, with high standards for both mathematics and formatting (i.e., LaTeX). 200 points are possible.
Math Culture:	Up to 50 Math Culture Points may be earned by participating in various activities outside of class, as detailed on page 3 of this syllabus.
Exams:	There will be a midterm exam worth 100 points and a final exam worth 200 points, with their dates listed in the schedule on page 2 of this syllabus.
Grading:	Grading will approximately follow a $[92.0\%,+\infty) \to$ A, $[90\%, 92\%) \to$ A-, $[87\%, 90\%) \to$ B+, $[82\%,87\%) \to$ B, $[80\%, 82\%) \to$ B-, $[77\%, 80\%) \to$ C+, $[72\%, 77\%) \to$ C, $[70\%, 72\%) \to$ C-, $[67\%, 70\%) \to$ D+, $[62\%, 67\%) \to$ D, $[60\%, 62\%) \to$ D-, $(-\infty, 60\%) \to$ F scale.
Makeups:	For fairness to those who follow the schedule, makeups for exams will be allowed only in extenuating circumstances, with documentation and advance notice when humanly possible. Late problem sets will be penalized 20% of points possible for each day late, and only accepted until others are returned.

A first course in topology serves as an ideal capstone for an undergraduate mathematics major. The material can proceed in a clear axiomatic progression, and can appear to be entirely abstract, but eventually sheds much light on a wide range of other areas of mathematics and applications. The real benefits of such a course do not come from passively receiving content from others, but instead from struggling with difficult ideas yourself. This course is designed to encourage (or force?) that. Thus, class time will be devoted almost entirely to students presenting the exercises from the textbook to the class. Proper notation and careful attention to detail will be expected at all times.

This course will give a traditional introduction to point-set topology, followed by a brief look at the fundamental elements of algebraic topology.

The minimal changes to schedule necessitated by the novel coronavirus pandemic are reflected in the schedule on the reverse of this sheet. Class meetings will be online for the remainer of the semester, but otherwise procede as before.

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Tentative Schedule

1/13 Chapter 1 Review	1/15 §2.1 Open Subsets of $\mathbb{R}$	1/17 §2.2 Topological Spaces
1/20 No Class – MLK Day	1/22 §2.3 Closed Sets and Closure	1/24 §2.4 Limit Points
1/27 §2.4 Int, Ext, Bd	1/29 §2.5 Basic Open Sets	1/31 Chapter 2 Review
2/3 §3.1 Subspaces	2/5 §3.2 Continuity	2/7 §3.3 Homeomorphisms
2/10 §3.3 Homeomorphisms	2/12 §3.4 $\mathbb{R}^n$	2/14 Chapter 3 Review
2/17 §4.1 Pairwise Products	2/19 §4.2 Finite Products	2/21 §4.3 Arbitrary Products
2/24 §4.4 Continuity of Operations	2/26 Chapter 4 Review	2/28 §5.1 Connectedness
3/2 §5.2 Connected Subspaces	3/4 §5.3 Connected Products	3/6 §5.4 Connected Inf. Products
3/9 Chapter 5 Review	3/11 §6.1 Compactness	3/13 **Midterm Exam**
No Class – Spring Break		
3/23 Extended Break	3/25 Extended Break	3/27 Extended Break
3/30 §6.2 More Compactness	4/1 Chapter 6 Review	4/3 §7.1 T_0, T_1, T_2
4/6 §8.1 Metric Spaces	4/8 §8.2 More Metric Spaces	4/10 §8.3 Sequences
4/13 §8.4 Complete Metric Spaces	4/15 Chapter 8 Review	4/17 Croom §9.1 Algebraic Topology
4/20 Croom §9.1 Algebraic Topology	4/22 Croom §9.2 Fundamental Group	4/24 Croom §9.3 $\Pi_1(\$_1)$
4/27 Croom §9.4 More about Π_1		
Final Exam – 11am Friday 5/1		

Any students with disabilities which might affect their performance in this class should contact me as soon as possible to arrange accommodations.

Coe's faculty has adopted an academic integrity policy. It is your responsibility to understand and follow it.

Diversity, in all its forms, is valuable.

Math Culture Points

A portion of the grade for this course will take the form of Math Culture Points. These will be earned through activities outside of class including, but not necessarily limited to, those listed below. Note that none of these are mandatory – there are far more opportunities than necessary to earn full credit. You should be able to select activities that are particularly relevant to you.

Activity	Points	Max #
Colloquium Attendance	5	
Colloquium Presentation	5-15	2
Meeting Attendance		2
Midwest Undergraduate Mathematics Symposium (4/6-7)	15	
Nebraska Conference for Undergraduate Women in Mathematics (1/26-28)	15	
SIGCSE Technical Symposium (?)	15	
University of Iowa Computing Conference (?)	15	
Hack-a-thon (?)	15	
Math Culture Reading		
Some weeks specific readings will be posted on Moodle	5	–
Articles from *Math Horizons*	5	3
With approval, articles from *Math. Magazine, The College Math. Journal*, etc.	5	3
Math Club Activities (when appropriate)	5-10	5
Winter Break Book Discussion, Movies, Pi Day Celebration, Workshops, etc.		
Other Appropriate Coe or Outreach Activities		
Contemporary Issues Forum (?)	5	–
Chess Club Meeting	5	4
Attending a Quantitative Research Symposium Presentation	5	3
Job Shadowing in any relevant field	10	1
Working with students at McKinley Middle School, etc. (see Jon)	5	5

Ideally you should spread your participation through the semester. You should track your activity and post a log of it, along with any exceptional observations, on Moodle.

Learning Outcomes

By the end of this class each student should be able to demonstrate:

- understanding of topology as an axiomatic system

- understanding of continuity and homeomorphism

- understanding of topological properties of product spaces

- understanding of compactness

- understanding of metric spaces

- understandning of the fundamental groups of some basic spaces

The Provost has decreed that the following text shall appear on all syllabi

Mission Statement: Coe College is a national, residential liberal arts college offering a broad array of programs in the arts, sciences, and professions. Our mission is to prepare students for meaningful lives and fulfilling careers in a diverse, interconnected world. Coes success will be judged by the success of our graduates. Academic Integrity At Coe College, we expect academic integrity of all members of our community. Academic integrity assumes honesty about the nature of ones work in all situations. Such honesty is at the heart of the educational enterprise and is a precondition for intellectual growth. Academic dishonesty is the willful attempt to misrepresent ones work, cheat, plagiarize, or impede other students academic progress. Academic dishonesty interferes with the mission of the College and will be treated with the utmost seriousness as a violation of community standards. Please refer to the Coe College Academic Catalog for complete information regarding Academic Integrity: www.coe.edu/academics/academic-resources/provosts-office/academic-integrity-policy FERPA Students should be aware of their rights regarding the privacy of their educational records. Detailed information about your rights can be found under the FERPA (Family Educational Rights and Privacy Act of 1974) section in the Academic Catalog and online here: https://www.coe.edu/academics/academic-resources/registrar/ferpa In line with FERPA restrictions, students should be aware that an instructor cannot publicly post grades by student name, institutional student identification number, or social security number without first having obtained students written permission. The Definition of a Course Credit & Expected Workload One course credit at Coe College constitutes 180 hours worth of student work over the course of the term. "Department of Education has defined one hour to be 50 minutes, so 150 60-minute hours is equivalent to 180 50-minute hours." This figure includes both the time spent in class and out of class completing course work. In other words, students are expected to devote a considerable amount of time outside of class to this course. For courses that meet in a standard MWF or T-Th slot, students should be expected to work seven hours a week outside of the three hours in class. Students with Disabilities: Request for Accommodation Coe College, in compliance with equal access laws, will make reasonable accommodations for persons with ADA qualifying disabilities. If you have a hidden or visible disability, or believe you may have a disability that affects your learning and may require classroom or test accommodations. I encourage you to visit my office during office hours or email to schedule an appointment at a mutually suitable time so we can discuss ways to support your learning within our class. Additionally, in order to receive accommodations in higher education, students must meet with Kim Pierson, the Accessibility Services Coordinator, to verify the disability and establish appropriate accommodations. The Accessibility Services Office is located in the Learning Commons in the lower level of Stewart Memorial Library (near the Testing Center desk). This office is responsible for coordinating accommodations and services for students with disabilities. Please call 319-399- 8844 or email accessibility@coe.edu to schedule an appointment. Reporting of Sexual Assault or Misconduct As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a faculty member. It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in any one-on-one meetings. I will keep the information you share with me private to the greatest extent possible. However, I am required to share information regarding sexual misconduct or students who may be in danger to themselves or to others. Students may speak to someone confidentially by contacting Student Development at 319-399-8843, Safety and Security at 319-399-8888, or Emily Barnard (college counselor) at 319-399-8843.