

SET THEORY & TOPOLOGY 9-9:50AM MWF SPRING 2016 SH309

- Instructor: Jonathan White
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- Office: Stuart 316
- Office Hours: 10:00-10:50am MWF and by appointment
- Office Phone: 399-8280
- Home Phone: 362-3350 (between 7am and 10pm)
- Text: *Introduction to Topology*, Crump Baker
- 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 100 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). 100 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 50 points and a final exam worth 100 points, with their dates listed in the schedule on page 2 of this syllabus.
- Grading: Grading will approximately follow a $[92.0\%, +\infty) \rightarrow A$, $[90\%, 92\%) \rightarrow A-$, $[87\%, 90\%) \rightarrow B+$, $[82\%, 87\%) \rightarrow B$, $[80\%, 82\%) \rightarrow B-$, $[77\%, 80\%) \rightarrow C+$, $[72\%, 77\%) \rightarrow C$, $[70\%, 72\%) \rightarrow C-$, $[67\%, 70\%) \rightarrow D+$, $[62\%, 67\%) \rightarrow D$, $[60\%, 62\%) \rightarrow D-$, $(-\infty, 60\%) \rightarrow F$ 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.

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Tentative Schedule

1/11 §1.3 Extended Set Operations	1/13 §1.4 Functions	1/15 §1.5 $f(A)$ and $f^{-1}(A)$
1/18 No Class – MLK Day	1/20 §2.1 Open Subsets of \mathbb{R}	1/22 §2.2 Topological Spaces
1/25 §2.3 Closed Sets	1/27 §2.3 Closure	1/29 §2.4 Limit Points
2/1 §2.4 Int, Ext & Bd	2/3 §2.5 Basic Open Sets	2/5 Chapter 2 Review
2/8 §3.1 Subspaces	2/10 §3.2 Continuity	2/12 §3.3 Homeomorphisms
2/15 §3.4 \mathbb{R}^n	2/17 §3.4 \mathbb{R}^n	2/19 Chapter 3 Review
2/22 §4.1 Pairwise Products	2/24 §4.2 Finite Products	2/26 §4.3 Arbitrary Products
2/29 §4.4 Continuity of Operations	3/2 Chapter 4 Review	3/4 Midterm Exam
No Class – Spring break		
3/14 §5.1 Connectedness	3/16 §5.2 Conn'dness & S'bspaces	3/18 Chapter 5 Review
3/21 §6.1 Compactness	3/23 §6.2 Prop. of C'mpact Spaces	3/25 Chapter 6 Review
3/28 §7.1 T_0 , T_1 and T_2 Spaces	3/30 §7.2 Regular Spaces	4/1 §7.3 Normal Spaces
4/4 Chapter 7 Review	4/6 §8.1 Metric Spaces	4/8 §8.2 Prop. of Metric Spaces
4/11 §8.3 Sequences	4/13 §8.4 Complete Metric Spaces	4/15 Chapter 8 Review
4/18 Croom §9.1 Algebraic Topology	4/20 Croom §9.2 Fundamental Group	4/22 Croom §9.3 $\Pi_1(\mathbb{S}^1)$
4/25 Croom §9.4 More about Π_1	4/27 Summary	
Final Exam – 2pm on Saturday 4/30		

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.

FERPA information can be found on page 42 of the 2015-2016 catalog.

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
Nebraska Conference for Undergraduate Women in Mathematics (January 29 - 31)	15	
SIGCSE Technical Symposium (March 2 - 5)	15	
University of Iowa Computing Conference (February or March?)	15	
Midwest Undergraduate Mathematics Symposium (April?)	15	
Mathematics Competition Participation		2
Mathematical Contest in Modeling (February 5 – February 9)	15	
Iowa Collegiate Mathematics Competition (February 21)	15	
Hack-a-thon (February 19-21, register by February 9)	15	
Math Culture Reading		
Some weeks specific readings will be posted on the course web page	5	–
Articles from Math Horizons	5	3
With approval, articles from <i>Math. Magazine</i> , <i>The College Math. Journal</i> , etc.	5	3
Math Club Activities (when appropriate)	5-10	5
Winter Break Book, Movies, Pi Day celebration, Speakers, Workshops, etc.		
Other Appropriate Coe or Outreach Activities		
Contemporary Issues Forum (February 3)	5	–
Chess Club Meeting	5	2
Attending a Quantitative Research Symposium Presentation	5	3
Job Shadowing in any relevant field	10	1
Other Volunteer Outreach (see page 4)	5	3

You should plan to spread your participation throughout the semester. In each case above, credit assumes both full participation and posting a brief summary/response on Moodle **in a timely manner**. These reflections should generally be between 100 and 300 words, and include both a brief summary and your personal thoughts on the event, and **must be submitted within one week of the event**, or within the specified time window for other activities. Up to three units of credit may be submitted after normal deadlines in the “Math Culture – Late” category on Moodle, but otherwise exceptions will not be made without serious extenuating circumstances.

Volunteer Math Outreach

Below is a preliminary list of organizations that have need for help with math tutoring and related activities. To learn more, contact Kayla Lyftogt (klyftogt@coe.edu). This list is not meant to be exhaustive, but gives you at least some idea of possibilities. If you have other ideas, talk to Jon.

McKinley Middle School

Volunteer Opportunity: Help an 8th Grade Pre-Algebra teacher by working individually with kids that are struggling/behind

Various Times Throughout Day

Garfield Elementary

Volunteer Opportunity: Assist Teachers by working individually with students that are struggling/behind

Various Times Throughout Day

Boys and Girls Club

Volunteer Opportunity: Assist with Math Homework on a case-by case basis (wider range of age groups)

After School Program

Kids on Course

Work Opportunity: Commit to tutoring two days a week at a local elementary. T/R 3:45-5:15. Some experience with youth preferred. Up to two hours of prep time paid in addition to hours spent tutoring.

Payment: \$33/hour.