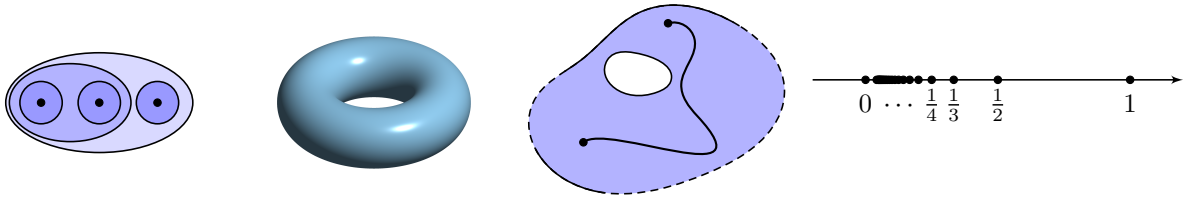

MATH 329: Point-Set Topology

Spring 2019 **Mt. Holyoke College**

Course Information:
Lecture Times: MWF, 11:00 AM–12:15 PM
Lecture Location: 420 Clapp Lab
Course Duration: Jan. 23–May 6

Instructor:
Nathan Gray
Office: 415B Clapp Lab
Office Hours: TBA
Email: ngray@mtholyoke.edu

Prerequisites: Passing grades in MATH 232 and any 300-level mathematics course, as well as previous exposure to reading and writing proofs, is required.

Textbooks: We will spend most of our time in *Introduction to Topology: Pure and Applied,* by Colin Adams and Robert Franzosa, Pearson, 2008. This book is required. We plan to cover most of chapters 0–7.

We will also cover some topics from *Essential Topology,* by Martin Crossley, Springer Undergraduate Mathematics Series, Springer, 2010.*

Course Description: This course is an introduction to point-set topology, which is a fundamental language for much of modern mathematics. One of the goals of topology is to understand what it means for a map to be continuous, first in Euclidean space and then generalized to other spaces. The core topics to be studied include: basic set theory, topological spaces, continuity, connectedness, and compactness.

Homework, Quizzes, Exams:

Homework: There will be weekly homework assignments. Students are expected to complete them on their own. However, collaboration with a classmate is acceptable, as long as each student writes and submits their own work. The lowest homework grade will be dropped at the end of the semester. ***Late homework is not accepted.***

Quizzes: There will be an in-class quiz every Monday. Each quiz will cover only definitions and named theorems from the previous week. The lowest quiz grade will be dropped at the end of the semester.

Exams: There will be a 75-minute, in-class midterm exam and a comprehensive, self-scheduled, 120-minute final exam. The dates of the exams are:

- Midterm Exam: Wednesday, Mar. 6
- Final Exam: Thursday, May 3–Monday, May 7 (self-scheduled).

Project: Each student will complete a project consisting of a paper and an individual presentation.

*A free PDF version of Crossley's book will be posted on the Moodle course site.

Paper: Each student will write a paper on a topic of their choice. The paper should include any necessary definitions/theorems, some examples to illustrate those definitions/theorems, and a short explanation on why the topic was of interest to the student. The paper—due at the end of the semester—must be no fewer than two pages in length.

Concerning the topic for the paper, it must be related to the course material. It could be from a section in Adams and Franzosa's book, or it could be an advanced topic in topology (e.g., from algebraic topology, or from knot theory), or it could even be on a topic from a popular book (e.g., O'Shea's *The Poincare Conjecture*). A list of possible topics will be given out during the semester.

Presentation: Each student will give a 15-minute presentation near the end of the semester on the material from their paper. The presentation is meant to demonstrate that the student has taken the time to learn new definitions/theorems with a focus on using examples to question and strengthen their own understanding. Moreover, it is meant to expose the class to something not covered in lecture.

Grading Policy: Course grades will be based on homework, quizzes, exams, and the project. Table 1 gives their weights. Throughout the semester, students may check their grades on the course Moodle site. ***Warning: The grades displayed on Moodle are raw scores.***

Earning 90%, 80%, and 70% in the course will result in course letter grades of *at least* A−, B−, and C−, respectively. The boundaries (cut-offs) between letter grades may be relaxed at the instructor's discretion, depending on the distribution of course numeric grades.

Table 1. Course Grades

Category	**Grade Basis**	**Weight**
Homework	lowest one dropped	30%
Quizzes	lowest one dropped	10%
Project	paper and presentation	15%
Midterm Exam		20%
Final Exam		25%
TOTAL		100%

Schedule: A tentative schedule can be found on the course Moodle site. Students should consult the schedule and read the relevant material *before* it is presented in lecture. The schedule will be updated periodically.

Course Help: Studying mathematics, particularly in 300-level courses, can be difficult. Here is some advice:

- Read the relevant material in the textbook before lecture.
- Complete every homework problem.
- Attend office hours.
- Complete every homework problem. (Yes, I am repeating this comment for emphasis.)
- Study and discuss the course topics with fellow classmates.
- If you have the time for it, consult another textbook for additional reading.

Attendance, Make-Up Policy: Students should understand the importance of attending lectures and doing the assigned work. When writing each exam and homework assignment, the instructor will assume that every student has attended every lecture. A student who misses a lecture is responsible for any announcements made during that time.

There are no opportunities to complete homework, exams, or quizzes either before or after their scheduled dates. A student who does not complete a grade item on time will earn a grade of 0 (zero) for that item. A legitimate absence due to a recognized MHC-related activity, a religious holiday, a verifiable illness, or an emergency will be reviewed on an individual basis. If a student must miss a lecture, then they must obtain permission from the instructor in advance.

Disability Accommodations: Mt. Holyoke College is committed to providing equitable access to learning opportunities for all students. If you have a disability and seek accommodations, please make an appointment with the instructor within the first two weeks of the semester so that appropriate arrangements can be made; documentation from the AccessAbility Services Office is required. You can contact AccessAbility Services in Mary Lyon Hall, or at `accessability-services@mtholyoke.edu`, or at (413) 538-2634.

Liberal Education: An important part of any liberal education is learning to use abstract thinking and symbolic (mathematical) language to solve practical problems. Topology is one of the three main areas of modern mathematical thought. In the last few decades, it has appeared in an explosion of diverse applications outside of mathematics. In this course, students will be exposed to theoretical concepts at the heart of introductory topology, commonly called point-set topology.

Scholastic Dishonesty: This includes: cheating on exams, homework, or quizzes; taking or using materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain grades dishonestly. (Collaboration on homework is encouraged, however.) ***All students are expected to follow the Honor Code.*** If it is determined that a student has cheated, they may be given a grade of F for the course and may face additional sanctions from MHC.