

# MTG 4303/5317: Elements of/Introduction to Topology 2

University of Florida, Department of Mathematics  
Course Syllabus, Spring 2021

**Instructor:** Peter Bubenik

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**Class meetings:** MWF 6th period (12:50–1:40pm), Fridays online, first class online, other classes online and in person, Little Hall Room 223

**Prerequisites:** MTG 4302/5316 with a minimum grade of C, or permission from instructor.

**Textbook.** Topology, Second Edition, by James R. Munkres.

**Additional references.** Wikipedia has articles on many of the topics covered in this course.

**Final exam.** Wed Apr 28, 12:30–2:30pm

**Midterm exam.** Wed Mar 3

**Course description.** In this course we will learn more advanced topics of general topology, and basic topics and examples in algebraic topology. Topology provides a general setting for studying continuous mathematics, and is a foundation for much of pure and applied mathematics. Algebraic topology translates difficult topological problems into computable algebraic questions. General topology topics include the Urysohn Lemma, Tietze Extension Theorem, Tychonoff theorem, Stone-Čech compactification. Algebraic topology topics include the fundamental group, the Seifert-van Kampen theorem, and the classification of surfaces. We will also learn some basic ideas of category theory.

## Course schedule.

Weeks 1–2	Countability and Separation axioms
Weeks 3–4	Tychonoff Theorem, Stone-Čech Compactification, Category Theory
Weeks 5–9	The Fundamental Group
Weeks 9–12	The Seifert-van Kampen Theorem
Weeks 13–15	Classification of Surfaces

**Course Objectives.** By the end of this course, you will have learned how take the time and effort to learn some sophisticated mathematical concepts, how to use them in proofs, how to write proofs and how to present your work. This course will prepare you for graduate work in the mathematical sciences and for working in technical and quantitative jobs in industry.

## Expectations.

- You will read the relevant notes ahead of class and use available resources (classmates, the textbook, the lectures, and internet resources) to learn the necessary concepts.
- You will come to class with a list of concepts that you didn't fully understand and questions that you have.
- You will be prepared to explain what you have learned.

**Course work and assessment.** The grading for the course will be based on homework 30 %, homework presentations 20%, midterm exam 20%, and final exam 30%.

**Class Demeanor.** This class will be synchronous and interactive with both online and in-person students. Students are expected to attend classes and to ask questions and answer questions. Online students are expected to dress as they would in class and are requested to share their video. Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Students are expected to avoid the use of technology for purposes unrelated to class and avoid eating during class time. Other students should be respected in discussion.

**Grading scheme.** A: 100% – 94%, A-: < 94% – 90%, B+: < 90% – 87%, B: < 87% – 83%, B-: < 83% – 80%, C+: < 80% – 77%, C: < 77% – 73%, C-: < 73% – 70%, D+: < 70% – 67%, D: < 67% – 63%, D-: < 63% – 60%, F: < 60% – 0%.

**Homework.** The best way to learn mathematics is to do mathematics. The textbook contains many good exercises and I will regularly assign a selection of these as well as my own problems. You are encouraged to discuss the exercises with your classmates, but you must write up your own solutions. Copying solutions or allowing your solutions to be copied is considered cheating. If you are unable to do any of the homework ask me for help as soon as possible. Solutions to some of the homework problems can be found on the web. Do not use these! It is considered cheating and you are depriving yourself of the crucial opportunity to learn by struggling with these problems.

Students will also be expected to present their homework solutions to the class. Being able to verbally explain your mathematical work is a vital skill. We will work together to fix up any arguments that are incorrect or unclear.

**Class attendance.** Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

**Disabilities statement.** Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

**Diversity statement.** The Mathematics Department is committed to diversity and inclusion of all students. We acknowledge, respect, and value the diverse nature, background and perspective of students and believe that it furthers academic achievements. It is our intent to present materials and activities that are respectful of diversity: race, color, creed, gender, gender identity, sexual orientation, age, religious status, national origin, ethnicity, disability, socioeconomic status, and any other distinguishing qualities.

**Course evaluation.** Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

**Academic honesty.** UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.” On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor.

**Grade points.** For current UF grading policies for assigning grade points see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.

### **Campus resources.**

#### *Health and wellness.*

- U Matter, We Care: If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) or 352-392-1575 so that a team member can reach out to the student.
- Counseling and Wellness Center: <https://www.counseling.ufl.edu>, 352-392-1575.
- Sexual Assault Recovery Services (SARS) Student Health Care Center, 352-392-1161.
- University Police Department, 392-1111 (or 9-1-1 for emergencies). <https://www.police.ufl.edu/>

#### *Academic resources.*

- Career Resource Center, Reitz Union, 352-392-1601. Career assistance and counseling. <https://career.ufl.edu/>
- Library Support, <https://uflib.ufl.edu/find/ask/>. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>