

# MTG 6347: Topology 2

University of Florida, Department of Mathematics  
Course Syllabus, Spring 2023

**Instructor:** Peter Bubenik

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**Class meetings:** MWF 6th period (12:50–1:40pm), Little Hall Room 225

**Prerequisites:** MTG 6346 or permission from instructor.

## Textbooks.

- Tammo tom Dieck. Algebraic Topology. European Mathematical Society, 2008. ISBN: 978-3037190487.

## Additional resources.

- Allen Hatcher. Algebraic Topology. Cambridge University Press, 2002. ISBN 0-521-79540-0. <http://www.math.cornell.edu/~hatcher/AT/ATpage.html>
- Glen E. Bredon. Topology and Geometry. Springer, 1993. ISBN 0-387-97926-3.
- Anatoly Fomenko and Dmitry Fuchs. Homotopical Topology, 2nd edn. Springer, 2016. ISBN 978-3-319-23487-8.
- James R. Munkres. Elements of Algebraic Topology. Perseus Publishing, 1984. ISBN 0-201-62728-0.
- Wikipedia has decent articles on many of the topics covered in this course.

**Course description.** This course is an introduction to algebraic topology. We will study singular, axiomatic, and cellular homology and cohomology, and their algebraic structure and dualities.

**Course objectives.** To understand the basic concepts in algebraic topology and be able to apply them in calculations and proofs. To understand and formulate mathematical arguments and to apply them in proofs. To be able to discuss mathematics. To be able to communicate mathematics in writing and orally.

## Course schedule.

Week 1–3	Singular Homology and Axiomatic Homology
Weeks 3–5	Homological Algebra and Cellular Homology
Weeks 5–9	Cohomology and its Multiplicative Structure
Weeks 9–13	Dualities
Weeks 13–15	Additional Topics

## Expectations.

- You will read the relevant notes ahead of class and use available resources (classmates, textbooks, internet resources) to try to learn the necessary concepts.
- You will come to class with a list of concepts that you didn't fully understand and also questions that you have.

**Course work and assessment.** The grading for the course will be based on solutions to homework problems.

**Grading scheme.** A: 90% – 100%, A-: 85% – 89%, B+: 80% – 84%, B: 75% – 79%, B-: 70% – 74%, C+: 65% – 69%, C: 60% – 64%, D+: 57% – 59%, D: 54% – 56%, D-: 50% – 53%, E: 0% – 49%.

**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.

**Class demeanor.** Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Please avoid the use of cell phones and restrict eating to outside of the classroom. Other students should be respected in discussion.

**Class attendance.** Requirements for class attendance 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>.

**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.a.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.a.ufl.edu/public-results/>.

**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.

**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://sccr.dso.ufl.edu/process/student-conduct-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.** More information on UF grading policy may be found at: <https://gradcatalog.ufl.edu/graduate/regulations/>

**COVID-19.** In response to COVID-19, the following recommendations are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to further the health and safety of ourselves, our neighbors, and our loved ones.

- If you are not vaccinated, get vaccinated. Vaccines are readily available and have been demonstrated to be safe and effective against the COVID-19 virus. Visit [one.ufl.edu](https://one.ufl.edu) for screening / testing and vaccination opportunities.
- If you are sick, stay home. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

### **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: Visit <https://counseling.ufl.edu> or call 352-392-1575 for information on crisis services as well as non-crisis services.
- Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit <https://shcc.ufl.edu/>.
- University Police Department: Visit <https://police.ufl.edu/> or call 352-392-1111 (or 9-1-1 for emergencies).
- UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; <https://ufhealth.org/emergency-room-trauma-center>.
- GatorWell Health Promotion Services: For prevention services focused on optimal well-being, including Wellness Coaching for Academic Success, visit <https://gatorwell.ufsa.ufl.edu/> or call 352-273-4450.

#### *Academic resources.*

- E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).
- Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services <https://career.ufl.edu/>.
- Library Support: <https://cms.uflib.ufl.edu/ask> various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>
- Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>
- Student Complaints On-Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>