MTG 7396: Advanced Topics in Topology 1  
University of Florida, Department of Mathematics  
Course Syllabus, Fall 2016

Instructor: Peter Bubenik  
E-mail: peter.bubenik@ufl.edu  
Phone: (352) 294–2342  
Office: Little Hall 410, Office hours: MW 6th period or by appointment  
My web page: http://people.clas.ufl.edu/peterbubenik/

Class meetings: MWF 8th period (3:00–3:50pm), Little Hall 219

Course description. This course is an introduction to some hot areas of current research in topology and their connections with other areas mathematics and the sciences.

Course schedule.

Weeks 1–3 Persistent Homology  
Week 4 Topology and Physics  
Weeks 5–7 Random Simplicial Complexes  
Weeks 7–10 Topological Data Analysis  
Weeks 10–11 Topology in Applications: the Brain and Materials Science  
Weeks 12,15,16 Presentations  
Weeks 13,14 Computer Work

Course Objectives. In addition to learning some exciting mathematics, the course will be structured to aid the transition from being a student of mathematics to being a mathematician. We will start with basic definitions and survey papers, formulate questions, access the mathematical literature and discuss what we’ve learned.

Course structure. The course will have the structure of a working group. You, individually and collectively, will have primary responsibility for learning and teaching each other the main concepts of the course. I will be there to facilitate this, help out when you get stuck, provide context and motivation, and elaborate on the main ideas with more advanced items. During class I will give you problems to work out together.

Expectations.

• You will read the relevant notes ahead of class and use available resources (classmates, internet resources, the mathematical literature) 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 were led to ask from your reading.
• You will be prepared to explain what you learned.

Course work and assessment. The grading for the course will be based on a presentation 30%, an accompanying written report 10%, a computational project 10%, and class participation 50%.

Resources.

(1) Herbert Edelsbrunner and Dmitriy Morozov. Persistent homology.  
(3) Frédéric Chazal. High dimensional topological data analysis.
**Grading scheme.** A: 100% – 90%, A-: 89% – 85%, B+: 84% – 80%, B: 79% – 75%, B-: 74% – 70%, C+: 69% – 65%, C: 64% – 60%, D+: 59% – 57%, D: 56% – 54%, D-: 53% – 50%, E: 49% – 0%.

**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.

**Course evaluation.** Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at [https://evaluations.ufl.edu](https://evaluations.ufl.edu). Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at [https://evaluations.ufl.edu/results/](https://evaluations.ufl.edu/results/)

**Disabilities statement.** Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [http://www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure 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://www.dso.ufl.edu/sscr/process/student-conduct-honor-code](https://www.dso.ufl.edu/sscr/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 [http://gradcatalog.ufl.edu/content.php?catoid=8&navoid=1493&hl=grade+points&returnto=search#grades](http://gradcatalog.ufl.edu/content.php?catoid=8&navoid=1493&hl=grade+points&returnto=search#grades)

**Student complaint process.** See [https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf)

**Other contact info.** Contact information for the Counseling and Wellness Center: [http://www.counseling.ufl.edu/cwc/Default.aspx](http://www.counseling.ufl.edu/cwc/Default.aspx) 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.