MAT 6932: Advanced Topics in Topology 2  
University of Florida, Department of Mathematics  
Course Syllabus, Spring 2017

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

**Class meetings:** MWF 8th period (3:00–3:50pm), Little Hall Room 237

**Prerequisites:** MTG 6347 Topology 2 or MAS 6332 Algebra 2, either previously or concurrently, or permission from instructor.


**Course description.** In this course we will introduce some powerful mathematical tools whose origins lie in algebraic topology but which have been useful in many other areas and have become objects of study themselves. Specifically, we will learn about Category Theory, Homological Algebra and Spectral Sequences. Each of these topics provides a formal framework for organizing mathematical structures and computations, and is an important tool in modern mathematics.

**Course schedule.**  
Weeks 1–5  Category Theory  
Weeks 6–9  Homological Algebra  
Weeks 10–12  Spectral Sequences  
Weeks 13–15  Student Presentations

**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. Students will be expected to work individually and with classmates to digest the course material, work out examples, present their work, ask questions, and discuss mathematics.

**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 have.  
- You will be prepared to explain what you have learned.

**Course work and assessment.** The grading for the course will be based on questions asked during the course 20%, short unscheduled presentations 20%, and one scheduled presentation 60%.

**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%.
Additional Resources.

(1) Wikipedia has good articles on many of the topics covered in this course.
(2) Basic Category Theory by Tom Leinster, is a great introduction to category theory and has just become freely available on the arXiv.
(3) Abstract and Concrete Categories: The Joy of Cats by Jiří Adámek, Horst Herrlich and George E. Strecker is available online and is a detailed introduction to category theory.
(4) Categories and homological algebra: An introduction to derived categories by Pierre Schapira, is a set of course notes available online that covers some of the topics that we will be covering.
(5) The nLab is a wiki for category theory and higher category theory. It is more advanced, but it’s a great resource once you are ready for it.

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. 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/.

Disabilities statement. Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, 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/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 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

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