

Syllabus – MAT 364/529: Topology and Geometry Fall 2020

Lecture: MWF 10:30am - 11:25am

Last updated: Oct 7, 2020 (new TA Zoom link)

Instructor:

Dr. Benjamin Dozier

Email: benjamin.dozier@stonybrook.edu

Link to Office Hours info (All of mine are via Zoom. Use MLC site for MLC hour, and below link for my OHs.)

OH Zoom link: <https://stonybrook.zoom.us/j/99009009730?pwd=MOE1VWRUNOUzajFUd3JacG9hN2lNQTO9>

TA/Grader:

Lilya Lyubich

Email: lilya@math.stonybrook.edu

Link to Office Hours info

Office: Math Tower 3-110

(Lilya's office hour will be in-person in her office, and she will also be on Zoom; YOU MUST WEAR A MASK if you attend in person. The first office hour will be **Sep 3**. Use MLC site for MLC hours, and below link for her OH.)

OH Zoom link: <https://us02web.zoom.us/j/4526086978?pwd=R1pRZUhPdUMxTE40NTgyUUZiU3BQQTO9>

Prerequisites: MAT 203 or MAT 220 or MAT 307 or AMS 261; MAT 200 or MAT 250

Advisory Prerequisite: MAT 319 or 320

Textbook: *Topology of Surfaces*, by L. Christine Kinsey

Course Description:

From Course Bulletin: “A broadly based introduction to topology and geometry, the mathematical theories of shape, form, and rigid structure. Topics include intuitive knot theory, lattices and tilings, non-Euclidean geometry, smooth curves and surfaces in Euclidean 3-space, open sets and continuity, combinatorial and algebraic invariants of spaces, higher dimensional spaces. This course is offered as both MAT 364 and MAT 529”

Topology constitutes a very important part of modern mathematics. It is the study of properties of shapes that do not change when we bend and stretch. For instance, to a topologist, a donut and a coffee cup are equivalent, since one can be continuously deformed into the other. We will cover some topics in full rigor, while other material will be treated at a more intuitive level. Throughout we will work on developing our ability to visualize various topological phenomenon. Topics we will cover include:

- The topology of the real line, higher dimensional Euclidean spaces, and more generally, metric spaces.
- Spaces built out of triangles and their higher-dimensional analogues
- Surfaces: properties and classification theorem
- Euler characteristic, an important and easy to compute topological invariant

Class sessions: This course will follow a “flipped classroom model.” My goal is to encourage a lot of interaction. Before class, you will watch a pre-recorded video covering new material. During the designated lecture time (MWF 10:30-11:25am), we will answer questions, and you will work with other students on homework problems in small breakout rooms. You will also get experience presenting solutions to problems. Each week you will figure out how to do several of the problems from the homework assignment during class time, and then later you will write up the solutions.

Technical equipment:

- **Required:** Internet access. For the pre-recorded videos, the live class sessions held on Zoom, and the oral exam
- **Required:** Microphone. To communicate during the oral exam, and during live class sessions.
- *Optional:* Webcam. If you have one, I encourage you to use it during class sessions since it improves interaction and communication, but I understand that there may be reasons that you do not want to be on video.
- *Optional:* Tablet that you can write or draw on. This may be helpful for class sessions.

Homework: There will be a weekly homework assignment - this will be the most important part of the course. You may, in fact are encouraged to, work on the problems with other students. You will write up your solutions (by yourself) either (i) electronically, or (ii) by hand (legibly), and then scan them (legibly). All assignments will be submitted on Blackboard.

Midterm: There will be a take-home midterm exam sometime in October. This will be similar to a homework assignment, except that you will not be allowed to work with other students (and we will not work on the problems during the Zoom sessions).

Final Exam: The final will have a written “take-home” component that you will have an extended period to work on (by yourself). There will also be an oral component held over Zoom. You should plan on keeping the designated exam time-slot (2:15-5pm, December 16) open, though some of the oral exams will need to be scheduled outside of this slot. If you foresee some problem with taking an oral exam, please discuss it with me in the first few weeks of the course.

Grading:

- Homework: 35%. The lowest score will be dropped (even if it is zero).
- Midterm: 20%
- Final, written: 20%
- Final, oral: 25%

University mandated syllabus statements

Student Accessibility Support Center Statement: If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, 128 ECC Building, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Academic Integrity Statement: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at

http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management Statement: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Course Evaluation: Each semester Stony Brook University asks students to provide feedback on their courses and instructors through an online course evaluation system. The course evaluation results are used by the individual faculty, department chairs and deans to help the faculty enhance their teaching skills and are used as part of the personnel decision for faculty promotion and tenure. No individually identifiable data are ever reported back to the university or instructor. Students who have completed previous evaluations can view all faculty ratings at: classie-vals.stonybrook.edu.