Textbook: Allen Hatcher, Algebraic Topology

Prerequisites: Point-set topology, abstract algebra (equivalent to Math 441 and Math 351)

Course Description: This course is an introduction to algebraic topology. The main idea of algebraic topology is to define various algebraic invariants for topological spaces. I will cover the first three chapters of Hatcher (but can not cover appendices, although there are many interesting materials there). I will also introduce some applications of algebraic topology on low-dimensional topology, especially 3-dim manifolds (the instructor’s research area).

Materials we will cover include: fundamental group, van Kampen theorem, covering spaces; singular homology, cellular homology and their applications; cohomology group and cohomology ring, Poincare duality. We will emphasize on computing these algebraic invariants by going over many examples.

Although this course requires point-set topology and abstract algebra as prerequisites, we do not need everything from these two courses. For point set-topology, we need: topological space, open/closed set, continuous function, compactness, path-connectedness, product space, quotient space. For abstract algebra, we need: group, subgroup, index of a subgroup, normal subgroup, quotient group, group homomorphism and isomorphism, presentation of groups.

Course meeting platform: We aim to do in-person meetings (at Hill 423) during the whole semester. Nevertheless, I will set up a zoom link during our regular teaching time, in case of emergency or the instructor is out of town. I will also set up a zoom link for our Wednesday office hour. Zoom links of these weekly (recurring) meetings can be found below:

Tuesday and Thursday lectures (2:00-3:20, just in case):
https://rutgers.zoom.us/j/98223829496?pwd=c0FaV051cm1HS1B5SiRGQW8xSVZxdz09

Wednesday office hour (10:00-11:00):
https://rutgers.zoom.us/j/95068135039?pwd=NkFVc3FWTVpOWXA0Z29kenVOV3F3UT09

Course Website: The official course website is Canvas and all registered students have access to it. All course announcements and materials will be posted on Canvas.
**Homework**: Homework is due on Tuesdays of every two weeks, by the end of the lecture (3:20pm), submitted either physically during the lecture or online (Canvas). The instructor will post homework problems on Canvas at least one week before the due date. We will withdraw the lowest homework grade.

Students can discuss with each other on homework problems, but should write his/her own solution. Directly copying solutions from online sources or printed solutions is prohibited.

**Exams and grades**: We will decide the style of the final exam after the semester starts. It will be either an oral exam, a take-home exam, or no exam. The homework grade will occupy at least 60% of the total grade, and the take home or oral final will occupy 40% of the total grade (if we have a final).

**Academic integrity**: All students in the course are expected to be familiar with and abide by the academic integrity policy (http://academicintegrity.rutgers.edu/). Violations of the policy are taken very seriously.

**Special accommodations**: Rutgers is fully committed to compliance with the Americans with Disabilities Act; policies and procedures are indicated at https://ods.rutgers.edu/.

Students who wish to request special accommodations must present a Letter of Accommodations to the instructor as early in the term as possible (https://ods.rutgers.edu/my-accommodations/letter-of-accommodations).

We will roughly follow the following schedule (may be subject to change).

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<td>Chapter 1.3</td>
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<td>12/13</td>
<td>Chapter 3.3 Other forms of duality</td>
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### STUDENT WELLNESS SERVICES:

**Counseling, ADAP & Psychiatric Services (CAPS).**
(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ [www.rhscaps.rutgers.edu](http://www.rhscaps.rutgers.edu/).
CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students’ efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

**Violence Prevention & Victim Assistance (VPVA)**
(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / [www.vpva.rutgers.edu](http://www.vpva.rutgers.edu/)
The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

**Disability Services**
(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / [https://ods.rutgers.edu](https://ods.rutgers.edu/).
Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: [https://ods.rutgers.edu/students/documentation-guidelines](https://ods.rutgers.edu/students/documentation-guidelines) If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: [https://ods.rutgers.edu/students/getting-registered](https://ods.rutgers.edu/students/getting-registered)

**Scarlet Listeners**
(732) 214-9069 / [https://rutgers.campuslabs.com/engage/organization/scarletlisteners](https://rutgers.campuslabs.com/engage/organization/scarletlisteners)
Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.