

# Math 231a, Algebraic Topology

M/W 9:00 AM – 10:15 AM

AUTUMN 2023

**Instructor:** Hana Jia Kong    **Email:** canvas  
**Office Hours:** TBD            **Location:** SC 221

**Textbook:** *A Concise Course in Algebraic Topology*, J. P. May [online version]

**Reference book:** *Algebraic Topology*, Allen Hatcher [online version]

## Class Policy:

### 1. Grades Biweekly Problem Sets: 100%

- (a) Biweekly problem sets will be distributed on Wednesdays (9.13, 9.27, 10.11, 10.25, 11.8, 11.22) and will be due in two weeks.
- (b) Late submissions will not be accepted.
- (c) Collaboration on problem sets is allowed, but everyone must write up their solutions independently.
- (d) Any additional resources or references used for problem-solving should be cited.
- (e) Give credit to AI tools whenever used, even if only to generate ideas rather than usable text or illustrations.

### 2. Office hours

- (a) Office hours are held in SC 237.
- (b) You are welcome to stop by anytime for quick questions.
- (c) Email me to schedule a time if you want a one-on-one meeting.

**Syllabus:** Weeks with an asterisk have only one lecture.

1. Week 1\*-2: Fundamental groups and van Kampen theorem
2. Week 3: Covering spaces and graphs
3. Week 4-5: Cofibrations and fibrations
4. Week 6\*: Higher homotopy groups
5. Week 7: Simplicial and CW complexes
6. Week 8: Cellular homology
7. Week 9-10: Axiomatic homology theory and properties, Hurewicz theorem
8. Week 11: Singular homology and the uniqueness theorem
9. Week 12\*: Universal coefficient theorem and the Kunneth theorem
10. Week 13: cohomology theory
11. Week 14\*: Manifolds and Poincare duality