MATH 4161 Algebraic Topology IV || Michaelmas 2019: homology

Class Monday and Friday 1400 – 1500, CLC 406 and CM107.
Problem class weeks 3,5,7,9, Tuesday 1300-1400 CM105.

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Office hours: Tuesday 1400-1530.

Plan for the course: The aim of the course is to learn about homology of spaces. We will learn its key properties, how to compute it, and some applications. Here is the plan for the course this term. It is a proper subset of the material in Chapters 0,1, and 2 of Hatcher's book.

(1) Introduction to homology using graphs.
(2) Definition of singular homology, homology of a point, H_0 of any space.
(3) Exact sequences.
(4) Homotopy invariance.
(5) Mayer-Vietoris and computations of homology groups.
(6) Relative homology and excision. Axioms for homology.
(7) Cellular homology.
(8) Applications of homology: Fixed point theorem, Borsuk-Ulam, Invariance of Domain.
(9) Covering spaces.

Lecture notes: I expect you to attend lectures and take your own notes during the lecture. If you are absent, I expect you to copy the notes of a friend or acquaintance. I will type notes containing the main definitions and statements, with references to Hatcher's Algebraic Topology book or Friedl's Algebraic Topology lecture notes for proofs, most of which will also be explained in lectures, along with discussion of many examples.

`http://pi.math.cornell.edu/~hatcher/AT/ATpage.html`

`https://www.uni-regensburg.de/Fakultaeten/nat_Fak_I/friedl/2018_algebraic-topology-iv.pdf`

Homework: Homework will be due in fortnightly in lecture the Monday immediately prior to each problem class.

Please talk to me or email me to discuss any special circumstances that I ought to be aware of.