Topology A (TOPA) / Fall 2008 / Alex Küronya

Class time: Tue 10:15 – 12:00, Wed 10:15 – 11:00 in BSM Room 105
Email: `kalex@math.bme.hu`
Office hours: Wed 11:00–12:00 in the faculty room (or in the classroom depending on the students' needs).

Text: The official text for the course is the set of lecture notes written by László Fehér, a former instructor of this course. It is available online, or may be bought at the office. During the semester I will distribute a typewritten version of my lectures that hope to serve as the official text from next term on. All comments are welcome.

Recommended literature:

- Bredon: Topology and Geometry, Springer, 1997
- Munkres: Topology, Prentice Hall, 2000 (2nd edition)
- Hatcher: Algebraic Topology, Cambridge University Press, 2002

Of these the first two are interchangable for our purposes. Both are very well written, with Munkres giving more details in general. The book of Hatcher is a good and very detailed introduction to algebraic topology, however, it covers only the last part of the course. At the moment it is still available online from the author's website.

Course Web Page: to be announced later

Prerequisites: Calculus, metric spaces, the notion of continuity, basics of set theory. The definition and basic properties of groups will also be needed during the second part of the course, but this can also be learned quickly in the form of supplementary reading. In case of need I can supply material that can be downloaded from the web (the course notes under `http://www.jmilne.org/math/index.html` are pretty good, for example).

Course description: This is a standard introductory course on point-set topology and the rudiments of algebraic topology, roughly equivalent to a first year graduate course on the subject. Our purpose here is to get acquainted with basic concepts of the field. For the most part, the course will be devoted to general topology: the topics covered include metric and topological spaces, continuity, homeomorphisms, construction of topologies, connectedness, compactness, and separation axioms (among many others). Along the way we will necessarily study numerous applications and examples, mostly coming from geometry. The particular applications we consider will to some degree depend on the background of the class. In particular, if there is enough interest, one can go beyond the standard geometric circle of ideas and have a look at how topology arises in algebraic/arithmetic geometry.

In addition, we will make a quick excursion into algebraic topology. The notion of the fundamental group of a topological space will be introduced, and we will use it to study covering spaces and (if time permits) the classification of compact surfaces.

The course is quite cumulative, so it is expected that you at least follow what is going on.

Grading and Exam schedule: There will be one in-class midterm and a cumulative final. In addition, there will be weekly homework, part of which will be graded. The midterm will count for 25% of the course grade, the final exam will count for 35% . The remaining 40% will come from the homework. The course will not be graded on a curve.

I do not plan make-up exams, unless there are very good reasons for it. In any case, travel convenience is by no means a sufficient reason.

Homework/class work: Homework will be assigned every Tuesday, however, only one or two problems per sheet will be graded (these will be marked by an asterisk). The problems to be handed in are due within two weeks. This means the *beginning* of the Wednesday class. No late homework is accepted.

Every correct solution to a homework problem is worth 5 points, but only one solution per problem will count. Occasionally, beside the compulsory homework problems there will be more challenging extra problems (marked with two asterisks). These can also be handed in, and in case of success, they will give you 10 points. The two-week rule applies here as well.

You are strongly encouraged to discuss homework problems with other students in the course, but please write up solutions in your own words. You are supposed to understand your own solutions in full detail.

No class attendance will be taken.