Topology – F10PC1 & F11PE1 – Autumn 2013

Contact info

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Timetable

Event	**Time**	**Room**
Lecture	Tue 15:15	CM G.01
Lecture	Wed 12:15	CM G.01
Lecture	Thur 11:15	CM G.01
Tutorial (F10PC1 only)	Tue 16:15	CM G.01
Tutorial (F11PE1 only)	Mon 16:15	CM G.01

Syllabus

- **Introduction:** A informal presentation of some of the notions in topology. [3 lectures]
- **Continuity:** We will precisely define abstract topological spaces, as well as the fundamental notions of continuity, continuous functions, and homeomorphisms. [7 lectures]
- **Compactness and connectedness:** In Euclidean space, a compact set is a closed and bounded one. We will generalized this notion to more abstract settings, and see various implications of this property. We will also discuss connectedness, which is a precise way of saying that the space is all in one piece. [8 lectures]
- **Identification Spaces:** One way to create new spaces is to identify certain pieces of a known space. For example, one obtains a Mobius strip by taking a rectangle, giving it a half twist, and then identifying a pair of opposite edges. We will discuss generalizations of this and the associated topologies. [4 lectures]
- **Fundamental Groups:** We will construct a group associated to each surface, which essentially characterizes the holes that are in the surface. [8 lectures]

Note: the number of lectures on each topic is provisional.

Assessment

Your assessment will be based entirely (100%) on the final exam. Please note that there are restrictions on the types of calculators that can be used for maths exams.

If you are registered in F10PC1, this will be a 2 hour exam with 4 questions, of which 3 (your choice which 3) will be marked. These questions will be based on the material presented in lecture and contained in the tutorial sheets, and each will be worth 20 marks.

If you are registered in F11PE1, this will be a 3 hour exam with 5 questions. The first 4 questions will be the same as on the F10PC1 exam, and 3 (your choice which 3) will be marked. These 4 questions will be based on material presented in lecture and contained in the tutorial sheets. The 5th question, which will necessarily be marked, will be based on additional reading. (I will let you know in advance what this material is.)

Feedback

There are several ways in which you can obtain feedback about how you are doing in the course. For example, roughly midway through the semester we will have a "practice exam". I will mark this and return it to you (although it will not count toward your assessment), so that you can get a sense of how well you are understanding the material, and if you are on track to obtain the marks you want on the final exam. In addition, there will be opportunities for you to obtain feedback during the tutorials.

Tutorials

Most weeks the tutorials will be used to discuss the exercises that were handed out during the preceding week. Solutions to these exercises will be posted online sometime after that (but in advance of the final exam). It is very important that you make a concerted attempt to solve these problems on your own, preferably before just listening to someone else tell you what the solution is or reading the solutions once they are posted online.

Vision

All course materials (lecture notes, tutorial exercises and solutions, sample exam, etc) and announcements will be posted on VISION:

`http://vision.hw.ac.uk`

If I need to contact you via email, I will do so using the VISION system. Other "official" information about the course can be found at

`http://www.ma.hw.ac.uk/maths/courseinfo/`

Sample exam

A sample exam paper is available on VISION. I strongly recommend revising first, then taking this sample exam as a practice exam (under exam-like conditions), and only afterwards looking at the solutions to see how you've done. Simply reading the solutions and making sure you understand them is generally not a good way to prepare for the actual exam. Simply memorizing the solutions to the sample exam is also not a good way to prepare.

Recommended books

If you would like some books to supplement the notes you take in lecture, I recommend the following two, both of which are available in the Heriot-Watt library.

- "Basic topology," by M. A. Armstrong. Springer-Verlag 1983. (Reprint of the original 1979 version.)
- "Topology: a first course," by J. R. Munkres. Prentice-Hall 1975.