CS195H: Computational Topology
Spring 2015

CS195H is an upper level course aimed at Math/CS concentrators who have a strong interest in mathematics and computation. In this course, we will study some theorems from topology -- typically theorems that say something about topological invariants, i.e., things that are preserved under continuous deformations -- and at the same time write programs that demonstrate a grasp of the theorems. If a theorem says that under certain conditions, one curve in the plane can be smoothly deformed into another, then the program can provide a constructive proof of the theorem. We'll mostly study curves and surfaces.

The Staff
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Expectations and Assignments
This is an exploratory class, so total number of hours spent on a homework may vary. However, students are expected to be mature and professional about their work habits and should expect to spend around 8 hours per week on the course outside of class. The course will focus on developing mathematical sophistication through computational exploration. With that in mind, we will be using Matlab/Mathematica or other high level languages to explore, and help better understand concepts in topology.
Homework assignments are generally due at 10pm on Wednesday nights. They will be made up of both programming and mathematical exercises. On each homework we will be explicit about which sections require code and which require written work.

Grading
Weekly Homework: 100%.

There will be no midterm or final, but we will probably ask that some homework assignments be completed entirely on your own.

Classes
Classes will be held 1:00-2:50 Tuesdays and Thursdays, CIT345.

Collaboration Policy
Collaboration will be encouraged in this class, as working together is an effective way of exploring new ideas. We are all working together to learn new things and so communicating with everyone is important. However there will be times when there is absolutely no collaboration. We will make these times very explicit. There are some rules for collaboration:

1. Please write on your home works with whom you have collaborated.
2. Please work on assignments with different people each week. This may be done by having pair-programming assignments where we assign pairs, or you can simply pick someone with whom you have not yet worked. If there are too few students in the class, some duplication will have to happen, but you should not be working with the same partner more often than necessary.
3. For the written parts of assignments, unless otherwise directed, please write up solutions on your own, separate from your partner, so that we can ensure that both partners really understand the solutions.
4. Please share any new coding idioms for Matlab/Mathematica or other useful pieces of information with the Entire class using the google group. (See Community Spirit Credit)
**Late Policies**

All homework assignments (coding and written) are to be handed in on the due date by 10 PM. We expect everyone to finish and hand in all homework, even if the due date has passed. This is an exploration class where the homeworks are cumulative, so this is necessary in order to get the most out of the class.

There will be a penalty of 10% for every 24 hour period after the due date of the homework. This means, if you hand in homework between 0:01 - 23:59 hours late 10% will be taken off and 24:00-47:59 hours late 20% will be taken off.

**Late Days:** Everyone is allowed two late days. (This does not mean 48 “late hours”). If you wish to use a late day on an assignment please tell the TAs before the assignment is due. This will extend your due date by 24 hours. They will not be tallied automatically, but you may use them as you see fit. You cannot retroactively use a late day.

**Community Spirit Credit**

In keeping with the goal of avoiding needless work, we will have a policy in which community service of particular kinds is rewarded. If, for example, you start working on an assignment and you find a bug in the support code (though it’s unclear how much support code there will be!), you can tell the course staff. Not only will they fix the bug, but they'll reward you with some number of points for community service. If you find a bug and fix it, you get more points.

There are other kinds of community service as well: in some homeworks, you'll work with Matlab or Mathematica or other programs. If you find a useful command or feature of that program and share it in the google group you'll get points as well.

Of course, it's not counted as a community spirit if you post the solutions for an assignment to the course google group. In general you should present community spirit contributions to a TA before posting to the newsgroup.

**The Newsgroup**

We are going to use a google group to keep everyone informed about anything important related to the course. If you have a question whose answer does not give away the key point of the assignment, please post it to the group. If in doubt, mail or ask a TA. The TAs reserve the right to anonymously post questions that they receive and answer them on the google group.

**Class Information**

Almost all course information will be available on the course web site. If there is information relevant to the class that does not yet appear on the webpage, feel free to talk to the TA, and he will consider placing it there.

You are responsible for knowing all the information in all articles posted on the google group -- read it frequently! (You're also responsible for all in-class announcements and material. “I missed that class” is not an excuse.)