CS205L
Continuous Mathematical Methods
(emphasizing Machine Learning)

http://web.stanford.edu/class/cs205l/index.html
CS 205 Course History

Mathematical Modeling of Continuous Systems
  2001-02 not taught...

New Emphasis on Robotics, Vision & Graphics (Fedkiw):
  Justin Solomon (@MIT now) 2013-14, 2014-15
  Doug James 2015-16, 2016-17, 2017-18

New Emphasis on Machine Learning (Fedkiw)
  CS205L: 2018-2019 .... THIS IS THE FIRST CLASS!!!
CS205L: Continuous Mathematical Methods with an Emphasis on Machine Learning

A survey of numerical approaches to the continuous mathematics used in computer vision and robotics with emphasis on machine and deep learning. Although motivated from the standpoint of machine learning, the course will focus on the underlying mathematical methods including computational linear algebra and optimization, as well as special topics such as automatic differentiation via backward propagation, momentum methods from ordinary differential equations, CNNs, RNNs, etc. (Replaces CS205A, and satisfies all similar requirements.) Prerequisites: Math 51; Math 104 or 113 or equivalent or comfort with the associated material.
CS205L

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Prerequisites: Math 51; Math 104 or 113 or equivalent or comfort with the associated material.
Problem Sets (50% of grade)

• Written; No programming assignments
• Assigned weekly on Thursday night, covers the Tues/Thurs lectures of that week (due 1 week later)
• 1 to 4 people in a discussion group; however, each person turns in their own unique-as-possible write-up
• 5 problems in all (one made by each of the 4 CAs)
  • CAs will only address their problem!!!
    • and other *general* course material
    • Each problem is graded on a coarse 0, ¼, ½, ¾, 1 point scale by the CA who created it
• 5th problem is created by you, and solved by you
  • You will be graded on this problem too (so target the same difficulty/scope)
  • It will be scored as either 0 points or 1 point
    • You may try again, if you did not receive the 1 point
Lectures

- I will mostly use the whiteboard, not slides
- Being the first time teaching the class, it will be more interactive
- Ask questions!
- Also, I will make mistakes - so ask questions!

- Lectures are taped, and attendance is optional
- Problem sets are based on the lectures, and related supplemental readings

- Friday is an optional CA section, probably on special topics/review
  - Also taped, also optional, also ask questions...
Final Exam (50% of grade)

• 2 Options (you choose):
  • Harder Open-Book Take-Home Final
  • Easier Closed-Book In-Class Final

• Take-Home Final will be passed out to the entire class
  • NO COLLABORATION IS ALLOWED OF ANY KIND
  • LECTURE NOTES AND BOOKS ONLY
  • You will have on the order of a day or couple/few days to work on it

• In-Class Final will be given at the usually scheduled time

• You may attempt both, and turn in the one you prefer to be graded
  • If an In-Class Final exists in our possession with your name on it, that counts as your choice/grade
Optional Programming Projects

• You may only attempt a programming project if you find a CA ready to sponsor you, and who approves of your project

• More popular CAs may fill up and be less willing to take projects less interesting to them

• Major Project
  • 50% of grade, in lieu of final exam
  • 1 or 2 person group

• Minor Project (simpler/smaller than a major project)
  • 25% of grade, reduces final exam choice to 25% of grade as well
  • No partners
-----Original Message-----
From: Ian Goodfellow

Ron, I don't know if you remember me, but I took your class circa 2009. Writing numerically stable code was a big factor in my success as a DL researcher, especially for GANs.
Questions?