Cogsci 109

Modeling and Data Analysis

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TAs and IA

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We have a course wiki.

http://cogs109.pbwiki.com

Please post all questions about homework, administrative details etc. to that site so that other students may also benefit from (or even provide) the answers. Only private questions should be emailed to the professor or TAs. We will also leave up relevant info from last year.

course web page:

http://cogsci.ucsd.edu/~desa/109/
Course Text

There is no “required” text for this year. Matlab for Engineers Explained (Gustafsson and Bergman) may be helpful if you need Matlab help. Amazon has for about $32.54)
Sections

In section you will

- Review the weeks material (ask questions where you are unclear)
- Receive help with homework (but TAs will not do your homework)
- Go over test questions, homework issues

Tues 9-10 and Thurs 12-1 sections were cancelled
Tues 10-11, Fri 1-2, **Wed 9-10** still have room
Rules

Cheating:
is prohibited. In particular you must write your own code and assignment solutions
(you may discuss these with others but not while taking notes). Having identical
code will be considered cheating.

Late policy:
Homework should be handed in on time. After that you lose 10%/day up to a max
of 50% of the points. You are best to hand in what you have completed at each
deadline. Exceptions can be granted for illness and emergencies (with verification).
The course webpage

Check it regularly: - I will put slides, updates, there

course webpage

It also has section/TA info
Course Description

This is a relatively new course designed to be both an

- A) “end of the road computation course” for non-Computational majors

- B) an introduction to serious Computational Methods for those taking the 118(A/B) courses.

Doing both well involves a somewhat difficult compromise but there are several aspects to both
Course Description

Doing both well involves a somewhat difficult compromise but there are several aspects to both

- Improve your programming skills
- Introduce you to the wonders of Matlab
- Give you a flavor for Cognitive Science data analysis and modeling applications (many of which will explained in mathematical depth in 118)
Expectations

We expect that you:

- have taken a programming course (not necessarily Matlab)

- are comfortable with basic calculus and simple methods for solving systems of equations

- will work hard (the University assumes approx 10 hours/week for the average student). This is considered a hard course – Do not fall behind.
This course may be challenging

• approach it as a challenge

• give it your best effort

• give yourself more time to read equations than text

• review your notes after class

• start your programming assignments early so you can ask questions if you get stuck

• struggle with, and understand, the homework and notes and the tests will be easy
Take responsibility for your education

- look at the extra resources provided (and find your own and share them with us)
- ask questions when you don’t understand
- ask for help when you need it
- but also give it a good try first – you will remember it better
- learn more than you “have” to
Expectations

We do not assume:

- that you know Matlab
- that you know linear algebra

We will review Math concepts as needed.
Grades

Homework: 30% IF you hand in all homeworks, we will remove your lowest homework grade. The plan is to have about 5 Homeworks.

Midterm 1: 20%

Midterm 2: 20%

Final exam: 30% If you do better on the final than either midterm, your final will count for 50%. If you do better on the final than both midterms, your final will count for 70%.

Grade Scale:
<50 F, 50-55 D, 55-60 C-, 60-65 C, 65-70 C+, 70-75 B-, 75-80 B, 80-85 B+, 85-90 A-, 90-95 A, 95-100 A+
Lecture Format

Most lectures will be given on the board with projection of the computer for presentation of MATLAB software or presentation of images or demos. Some lecture material may also be given in slide format.

Please ask questions when you don’t understand!
General Course Outline

- A few introductory lectures on Matlab (and other Matlab sprinkled throughout course as needed)
- A few weeks of data analysis (techniques to use and caveats to avoid)
- A few weeks of computational modeling

course website
Why do you need this course?

- No matter what you do, taking in a large amount of data, extracting what you need from it, presenting it to others, and being able to generalize from it to predict future situations, will be important.

- If you are very good at this, great companies like Google will pay you a lot to work for them!

- Proper data analysis and presentation is crucial for all scientific research. We will take examples from a few different areas of Cognitive Science.

- All interpretation of data, involves a (possibly implicit) model. It is good to better understand your models, their assumptions, and other modeling options.
Why are Computational Models useful?

- They force you to be explicit about your assumptions
- Help us to come up with new explanations for phenomena
- Tie explanations to the biological mechanism
- Can be tested and proved wrong – This can be very informative
Issues in modeling

- Adequate (but not too much) level of complexity
- Best if account for more than one set of data
By the end of the course

You will be able to

• program in Matlab

• easily visualize data in different ways and understand what the benefits of different methods are

• perform simple statistical tests and MORE IMPORTANTLY better understand what they are telling you

• fit curves to data

• design and train basic neural networks AND understand the issues involved
• (hopefully) be proud of the effort you put in and how much you learned
MATLAB is self-teaching

Open Matlab and run

>> demo

(view some of these videos)