The seminar in applied mathematics is a required course for Columbia juniors and seniors majoring in applied mathematics, and is open only to undergraduates majoring in applied mathematics.

The senior seminar meets Monday and Wednesday and is a chance for seniors to crystalize their research interests, to begin writing about these interests, and to transition from student to active researcher. Seniors will themselves choose the topics to be discussed, external speakers of interest, and in the later part of the course will present, in pairs or sometimes individually, topics of their choosing to the juniors and to their fellow seniors.

Both Juniors and Seniors can use these lectures to formulate possible research topics and postgraduate plans.

1 Grading policy

Seniors: assignments to be sent to apma4903@gmail.com your grade will be a function of 3 things:

1. attendance
2. an oral presentation to the juniors or to your fellow seniors on a research topic of your own choosing.
3. if you are taking the seminar for 4 instead of 3 points, a research proposal to be turned in before 5 pm 1 week after the last lecture. This document should be at least 5 substantive pages (e.g., not 1 page of “title page”) and should summarize the field in which you are most interested, introduce a specific research question, and describe what you will do to answer it. If possible, you should include your preliminary results, data, and/or figures. You should take advantage of the oral presentation as a chance to concretize your individual research interests and you should definitely take advantage of the feedback you get from the juniors and from your fellow seniors. This year the last lecture is Monday, December 10, 2018, so your proposal is due 5:00 pm Monday December 17, 2018 and must be sent from your columbia email to apma4903@gmail.com.

Part of being a researcher is collaboration. If/when you go to the real world, no one will mind if you got help. They will care if you understand what was
requested of you and if you got the job done well. For that reason, I want you to collaborate, and your final project can be a collaborative one.

However, I expect the same person-hours from everyone. If your group is twice as big, your project should be twice as impressive.

I also want you to communicate your results. That is why there will be final presentations.

Part of being a good collaborator and a good communicator is to acknowledge the sources you used and the people who helped you. Be sure and include these acknowledgements to people who helped, and cite sources for text, images, or ideas you use.

Lastly, I want you to be able to think critically, so these projects will be in front of your peers, who will of course engage you with the spirit of participatory inquiry one expects from Columbia undergraduates.

2 the timeline for and content of your talks

Please read this section. If you don’t understand it, let me know now. After your grade has been submitted is too late to discuss things (see below). If you don’t read this section, you will be confused when I bring up these written rules during your talk, asking you please to read this document, which will be too late to be constructive.

2.1 content

1. The first slide should contain, in addition to anything else you’d like, the names of the 1 or 2 presenters. Please start the talk by describing why you got interested in the subject.
2. The second slide should contain a list of your 1-3 primary references, including author names, years, titles, and, if from a journal, the name of the journal.
3. If you used websites for research (e.g., wikipedia), please include them among your references.
4. All talks should include some chalk (a derivation) and/or some original code and figures generated by that code. In case this is not clear: chalk/code should be relevant to your talk, not a tangent or diversion.
5. Do not show graphics taken from websites without attribution on the same slide. Do not quote extensively from websites or other sources without quotation marks and listing the source of the quote. If an unattributed quote is long enough for me to identify it by googling, it’s plagiarism (see below).
6. Use complete sentences rarely on your slides, if at all. You will be speaking at the same time as you present, and an audience will be overwhelmed trying to follow you and the text at the same time.

2.2 the nugget, and the role of math

The most important part of your talk as a senior is the technical nugget. This should be a derivation, usually in chalk, or a demo of code presented along with the pseudocode.

If you’re not demoing code and pseudocode, a nugget should be a proof or a derivation.

In a proof or a derivation, you start at point A and goto point B. A is one relation or equation. B is another, and you “go” from one to the other using mathematics.

Code that’s presented in this class should be scientific computation, using a computer to explore predictions or understand a model. Pseudocode, like derivations, present the essential parts, and knowing what’s essential requires understanding.

Let me know — before your presentation — if this does not make sense.

2.3 timing

1. 2 weeks in advance:
   (a) meet with me regarding potential topic,
   (b) present an outline of what you plan to discuss
   (c) identify what your primary references will likely be

2. 1 week in advance:
   (a) email me a copy (preferably a google doc or google presentation file) of your presentation files or notes on what chalk you plan to present. we will then go over your talk content together (This instruction used to be ‘hand me a hard copy’, meaning print it out, but really who does that anymore?)
   (b) edit online schedule ( http://bit.ly/f2018seminar ) to include your title and, if topic is not clear from your title, your topic. 2

3. before your talk: email me the soft copies of your presentation files or notes on what chalk you plan to present to apma4903@gmail.com

3 legal disclaimers: grading

Please note that the Faculty Handbook makes explicit constraints on what I can and can not do when it comes to grading. Although it is precedented to make unusual arrangements for a student before a grade is assigned, e.g., for health reasons or other extenuating circumstances with approval of a dean, “Once qualitative grades are given, they may not be improved through the submission of additional work by the student.” “Changes to final grades normally may be made only to correct an error…. The grounds for changing a disputed grade are very limited.”

4 legal disclaimers: plagiarism

http://bulletin.engineering.columbia.edu/policy-conduct-and-discipline makes clear Columbia’s (and therefore my) policies regarding plagiarism, singling out the use of online material:

One of the most prevalent forms of plagiarism involves students using information from the Internet without proper citation. While the Internet can provide a wealth of information, sources obtained from the Web must be properly cited just like any other source. If you are uncertain how to properly cite a source of information that is not your own, whether from the Internet or elsewhere, it is critical that you do not hand in your work until you have learned the proper way to use in-text references, footnotes, and bibliographies. Faculty members are available to help as questions arise about proper citations, references, and the appropriateness of group work on assignments. You can also check with the Undergraduate Writing Program. Ignorance of proper citation methods does not exonerate one from responsibility.

The site also makes clear what sanctions will result.

5 logistics and laptops

• Usually I sit in the back of the room, emailing students I see on Facebook during class. As an experiment this term I will sit in the front instead. If you see me using my laptop rest assured it’ll be to research the article being presented, or a Wikipedia page on the technique being discussed. I encourage you to do the same, but please sit in the back if you’re using a laptop so as not to distract students who are paying attention.

• Usually I invite alumni to speak so that you can see how the material you are learning relates to careers for which your skills are in high demand. Based on feedback from prior students I will not be inviting alumni this
term. If you’d like to hear from alumni let me know and I’m happy to work with your student chapter of SIAM to set up a talk (or talks?) from alumni.

6 links

If you want to look back at the links from day one of the class, you can find them here:

- day 1 presentation file: http://bit.ly/4901day1

also: