GEO 325M/GEO 398M
Numerical Modeling for Geoscientists

Spring 2026

(27915/28310)

Student backgrounds?

Graduate & Undergraduate sections :

GEO 325M: 19 + GEO 398M: 9 = Total: **28**

Background:

Geo	18 + 6 = 24
Engineering	1 + 3 = 4
Maths/Phys	0 + 0 = 0
Other	0 + 0 = 0

Pre-requisites

- Course pre-requisites:
  - Geological Sciences 325G or 352P: Programming
  - Mathematics 427J: Differential Equations with Linear Algebra
  - Mathematics 427L: Vector Calculus (Div, Grad & Curl)
- If you don’t meet the pre-requisites:
  - Try to take a math class in parallel (worked in past)
  - Be honest with yourself and pull out if it is too hard.
  - (GEO 325C Continuum Mechanics covers vector calculus!)
- This year is an experiment.

Logistics 1

- **Class time:** T/Th 9:30-11:00 am
- **Class room:** JGB 3.120
- **Course websites:**

  Class website: https://mhesse.github.io/numerical_modeling/

  Canvas: https://utexas.instructure.com/courses/1436793

  Piazza: https://piazza.com/class/mkbegn3nlw7ok

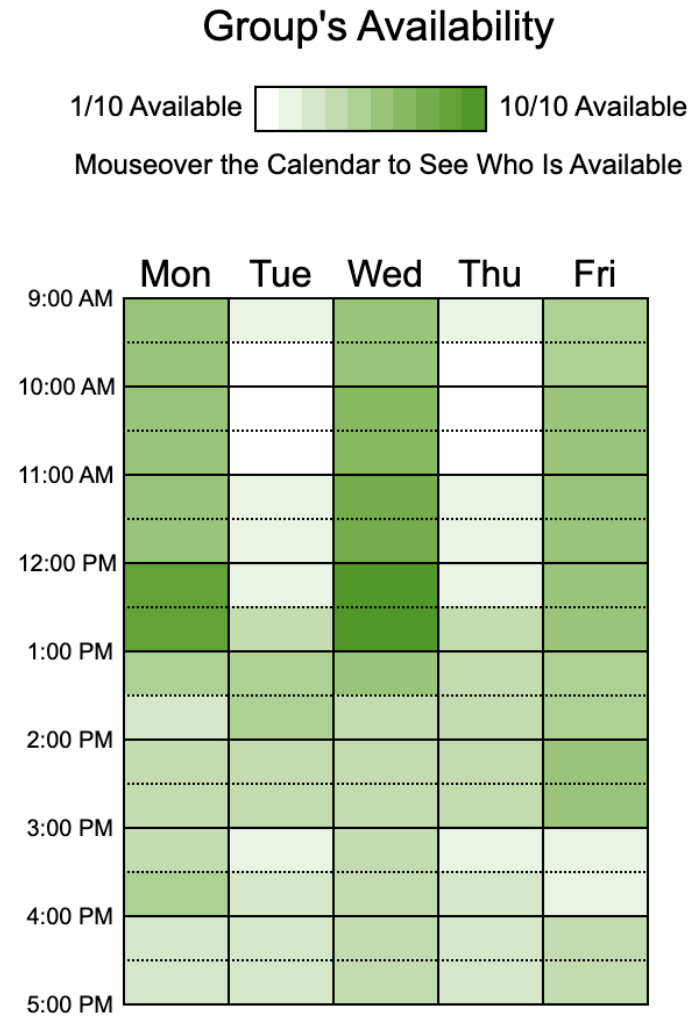
  Matlab Grader: https://grader.mathworks.com/courses/171860-geo-325m-398m-numerical-modeling-2026

- **Pre-requisites:** Mathematics 427J & 427L
  Differential equations with linear algebra
  (Mathematics 408D: Multivariable calculus)
  Matlab

Logistics 2:

- Instructor: Marc Hesse
  email: mhesse@jsg.utexas.edu

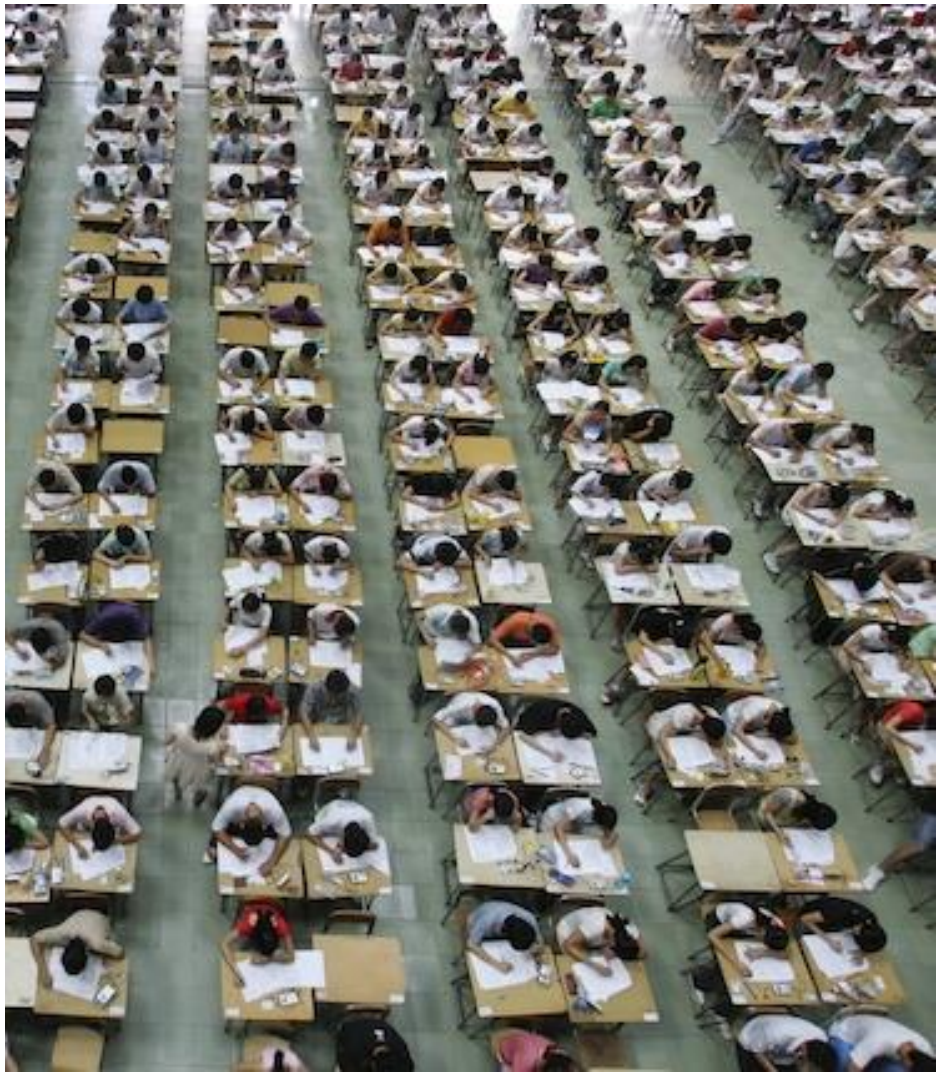
  office hours: TBD
  Please fill out poll for office hours
  https://www.when2meet.com/?34317196-A8uc5



Grading

- Regular homeworks
- Midterm (Mar 12)
- Final (Apr 30)
- No extra credit shenanigans.

Total grade:
U: 50% HW + 30% Exams + 20% Attendance
G: 50% HW + 30% Exams + 20% Project



Grading scheme

		77% - 80%	C+
94% - 100%	A	74% - 77%	C
90% - 94%	A-	70% - 74%	C-
87% - 90%	B+	67% - 70%	D+
84% - 87%	B	64% - 67%	D
80% - 84%	B-	60% - 64%	D-

0% – 60% F

Student feedback I

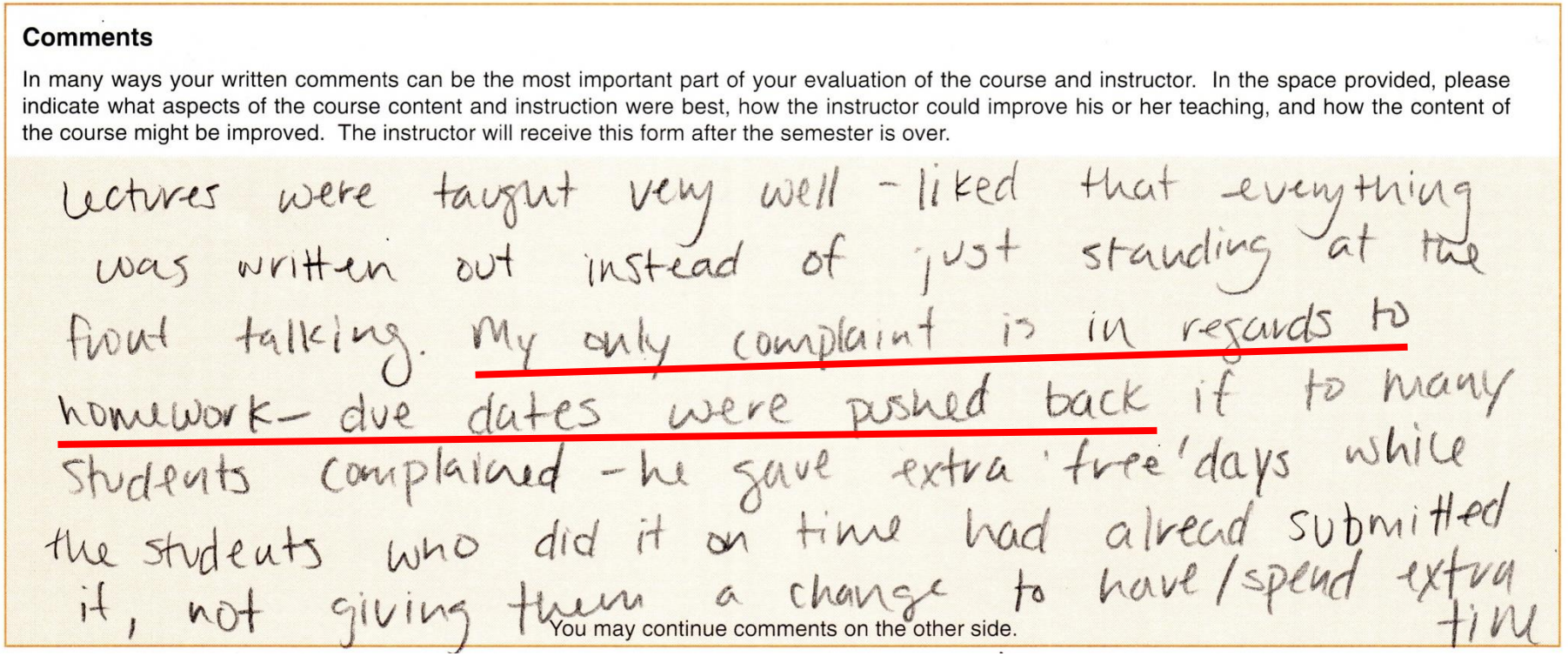
Comments

In many ways your written comments can be the most important part of your evaluation of the course and instructor. In the space provided, please indicate what aspects of the course content and instruction were best, how the instructor could improve his or her teaching, and how the content of the course might be improved. The instructor will receive this form after the semester is over.

I strongly disliked that you would change the due dates for the HW assignments at the LAST minute. I don't think its fair for those who turn it in on time.

You may continue comments on the other side.

Student feedback II



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Lectures were taught very well - liked that everything was written out instead of just standing at the front talking. My only complaint is in regards to homework- due dates were pushed back if to many students complained - he gave extra 'free' days while the students who did it on time had alread submitted it, not giving them a change to have/spend extra tim

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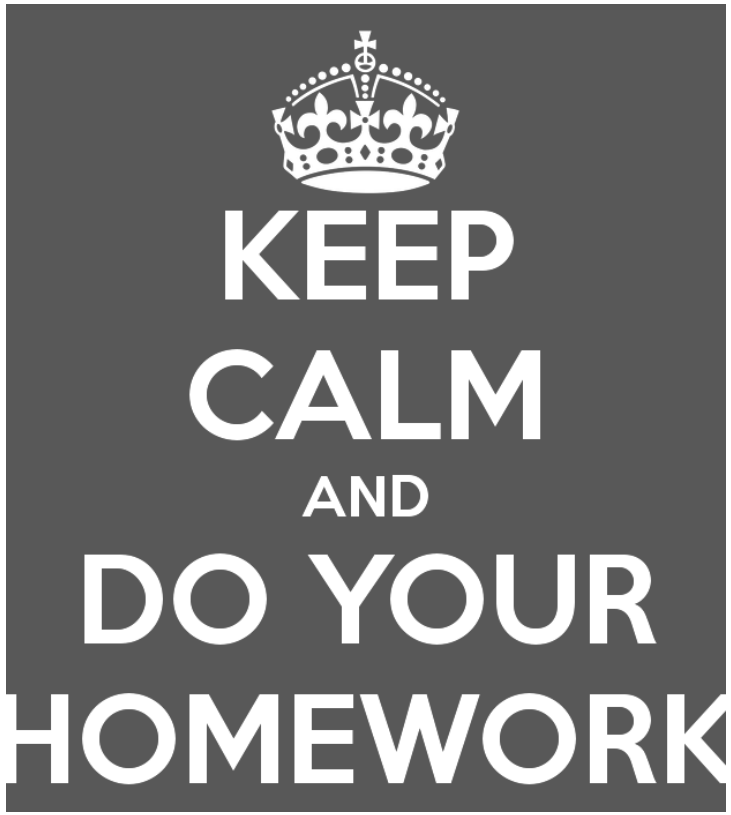
Student feedback III

While you of course have no obligation to do so, I really do think the way you evaluated this class was very unfair. You constantly extended homework's at the last minute, giving those who would not have turned it in on time a second chance. You only took off 10% for late assignments and dropped the lowest homework grade. This just rewards those who did not complete their assignments on time while not rewarding those of us who did.

No gratuitous homework extensions



- Due Thursday 9:30am
- Submitted on Matlab Grader
- Late penalty is 10% (of total points)

You can discuss the homework, but you have to code up the answers by yourself. Do not copy and paste code from other people.

Special rules

- To get credit you have to complete every problem on a homework!
- You must complete HW1 before you can get credit for HW2 …

- This simulates the fact that the code you develop builds on each other. Code either works entirely or not at all. Basic problems must be solved before you can add new functionality!

AI rules

- If you use AI you will not learn the material in class!
  => Won't be able to do the exams!

- You cannot use AI to solve your HW problems
- If AI use is detected: 0 pts on HW

- If you have difficulties with homework, come to office hours!

PROGRAMING LANGUAGE IS MATLAB

Please download the newest version of Matlab here:
[Click here for Matlab]

Computer rooms accessible to you:
JGB 3.326, JGB 4.202, EPS 2.103

What is your Matlab background?
Confident:
Occasional:
Never used it:

Overview of Geophysics Computing sequence

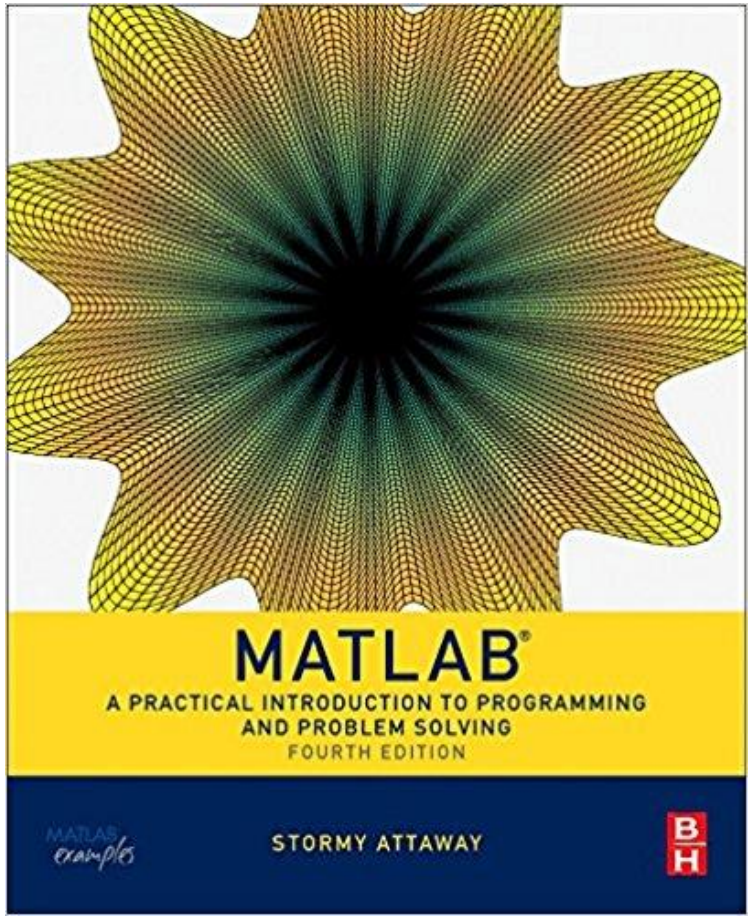
GEO 325G COMP APPLS IN GEO
Introduction to Basic
Programming in Matlab
(Spring Sophomore)

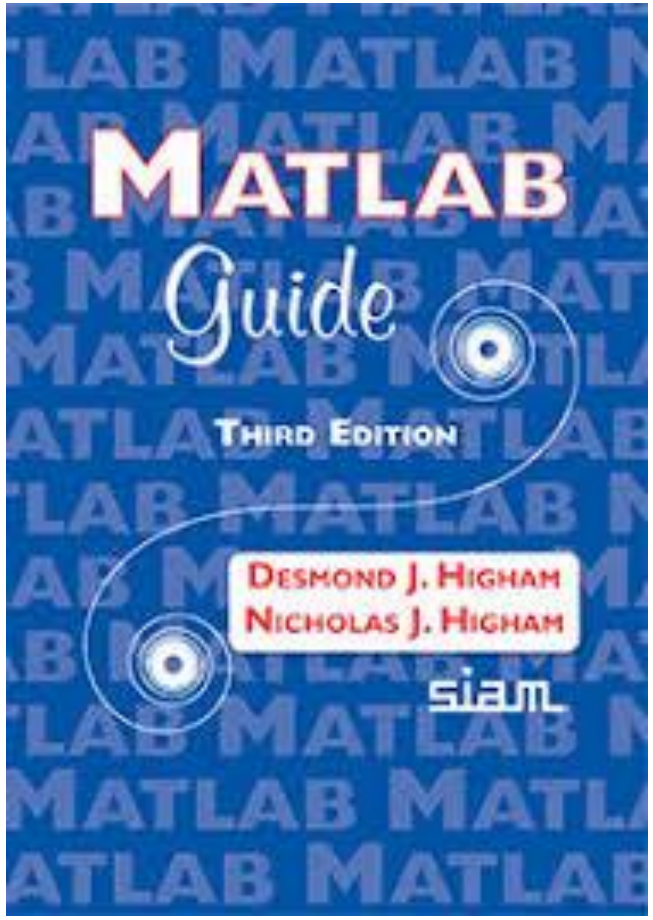
GEO 325M NUMERICAL MODELING GEOSCI
Emphasis on modeling of physical processes:
Heat flow, fluid dynamics, wave propagation
Partial differential equations
Pre-reqs: Math 427J and 427L
(Spring Junior or Senior)

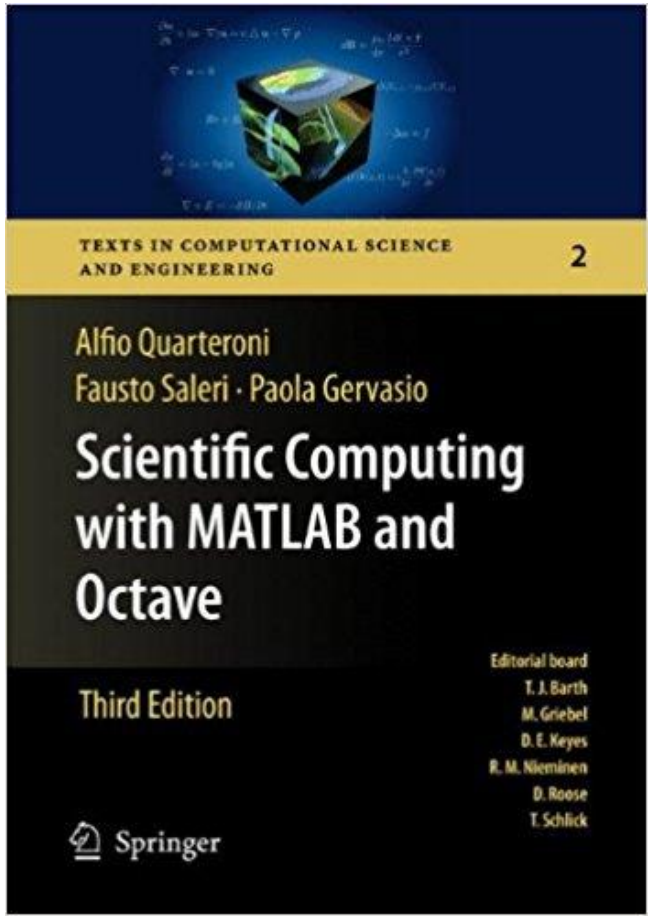
GEO 325K COMPUTATIONAL METHODS
Emphasis on signal processing:
Samplin/aliasing, discrete Fourier transforms,
convolutions, filters, statistics
Pre-reqs: Math 427J
(Fall Junior or Senior)

Textbooks

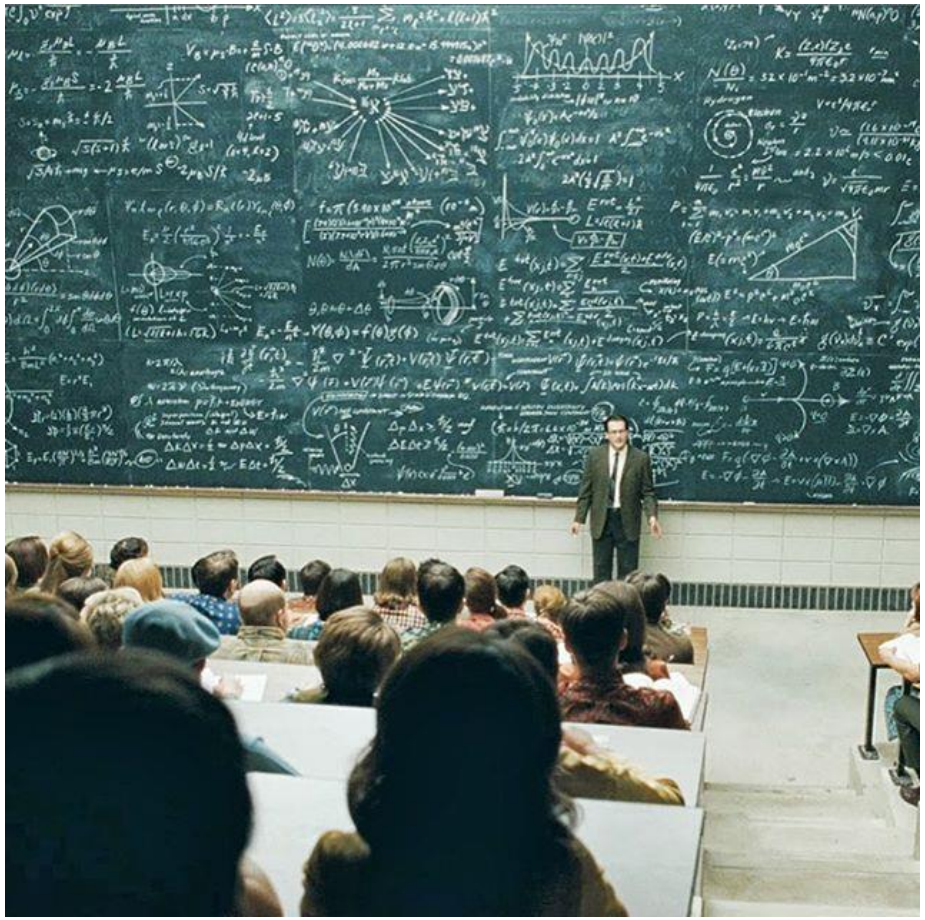
I am not following a textbook, but the following my be useful







Vintage lecturing style



For physics and math parts I will teach on the board/ipad, so it will be useful to have paper, pencil and eraser!

For Matlab we will use the new Live Script format. This is why you need the new Matlab version.