

00. Syllabus

CSS 322

- (The full syllabus is in the Google Classroom).
- **Instructor:** Gun Srijuntongsiri.

The textbooks

- **Scientific Computing: An Introductory Survey.** Michael T. Heath. Second edition.
Official E-book: <https://doi.org/10.1137/1.9781611975581>.



Lecture notes will be available online at the Google Classroom for this class before each respective class.

Homework

- Mandatory.
- Homework must be submitted to the Google Classroom system.
- Not graded on correctness; simply submitting them on-time will earn you full scores.
 - But do try to solve them so you are prepared for the exams.
- Discussing the homework with your classmates is OK but do write down the solution yourself.

Late homework policy

- Late submission will have your score deducted by 10% for each 24 hours late.
- For example, suppose each homework is worth 10% of the final score. Submitting homework 15 hours later than the deadline means you will get 9% for it instead; 30 hours later than the deadline means you will get 8%.
- **Exception:** If you have good reasons (e.g. sick, being in an accident) for late submission, let me know and you will not get penalized.

- We will have both midterm and final exams.
- They will both be semi-open book.

Grading

- 40% Homework
- 25% Midterm
- 35% Final

- **All sections that I teach will be graded and curved together.**
- Let μ denote the class median and σ denote the standard deviation.
- The approximate cutoff for each grade is as follows:

Grade	Minimum score to get this grade
A	$\mu + 0.7\sigma$ and top 20% of the classes
B+	$\mu + 0.3\sigma$
B	$\mu - 0.1\sigma$
C+	$\mu - 0.5\sigma$
C	$\mu - 0.9\sigma$
D+	$\mu - 1.3\sigma$
D	$\mu - 1.7\sigma$

An example

- Suppose the class median (μ) is 50 and the standard deviation (σ) is 10.
- Substituting $\mu = 50$ and $\sigma = 10$ to see that
- You will likely get an A if your final score is greater than or equal to 57 and among the top 20% of the classes,
- B+ if your score is greater than or equal to 53 but less than 57,
- B if your score is greater than or equal to 49 but less than 53, and so on.

Topics covered

- Introduction to scientific computing and motivation
- Matrix review
- Getting started with MATLAB
- Linear systems
- Norms
- Approximation and computer arithmetic
- Conditioning and stability
- More on solving linear systems
- Interpolation
- Numerical integration (a.k.a. quadrature)
- Numerical differentiation
- Linear least squares

- Nonlinear equations
- Optimization
- Initial value problems for ordinary differential equations
- Singular value decomposition
- Eigenvalue problems
- (Optional) Boundary value problems for ordinary differential equations
- (Optional) Partial differential equations
- (Optional) Global optimization
- (Optional) Iterative Methods for Linear Systems
- (Optional) Linear programming