

**Due date of this homework: January 14th, 2026 at 11:59:59.** This homework corresponds with Module 1.

1. All of your homework assignments should ideally be typed. Not mandatory, really, but you should start getting to the habit of producing well-written and well-presented documents (that are clean, elegant, and not sloppy). So you can use MS Word or make life easier and learn how to use  $\LaTeX$ . Please use whatever software you're comfortable with.  $\LaTeX$  produces a much better-looking document and typing it in is super easy, especially when typing equations and formatting figures, tables, plots, etc... Please go through this 30-minute guide:
  - [https://www.overleaf.com/learn/latex/Learn\\_LaTeX\\_in\\_30\\_minutes](https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes)
  - <https://www.overleaf.com/learn/latex/Tutorials>
2. Once you are done with reading about  $\LaTeX$ , please reproduce this PDF file which is a sample homework: [https://www.dropbox.com/scl/fi/iyeolgr2b1m354wqm5yt3/sample\\_homework.pdf?rlkey=rriem5on0gc7pe92neljhawex&dl=0](https://www.dropbox.com/scl/fi/iyeolgr2b1m354wqm5yt3/sample_homework.pdf?rlkey=rriem5on0gc7pe92neljhawex&dl=0)

I am giving you the source file of the homework template so you have the codes for the format and header. Make sure your generated PDF is nearly identical to the sample homework PDF above.

3. Read Chapters 2 and 3 in this PDF:

<https://www.dropbox.com/scl/fi/cj2pisphgqa4knmuljj46/Chapra-Chapters1-3.pdf?rlkey=exqifu7zhci2u1qq0imqahra6&dl=0>

This should give you a proper introduction to programming in Matlab. You should already know some programming basics, and these chapters introduce you to programming in Matlab. You will be using Matlab in many future classes, so it's important to understand the basics. No fancy programming will be required in this class. It's more about calling functions and coding simple numerical methods in loops, and that's what the book chapters mostly cover. These are some of the key things I want you to understand from reading these two chapters:

- Handling matrices, vectors, scalars. Matrix addition and multiplication, for example, is important.
- Calling known Matlab functions.
- Plotting figures with multiple plots on the same figure (using subplot command).
- Using for and while loops.
- Learning if-else and case structures, with or without for/while loops.
- Designing your own Matlab script/m-files/functions to define a specific function.

4. Solve Problems 2.17, 2.20, and 2.21 on Pages 46 and 47 (or 43-44/84) in the PDF

<https://www.dropbox.com/scl/fi/cj2pisphgqa4knmuljj46/Chapra-Chapters1-3.pdf?rlkey=exqifu7zhci2u1qq0imqahra6&dl=0>

Make sure that your plots are clear, well-presented, and pretty (yes, pretty). This is a great opportunity for you to design your own Matlab/Python plotting template that showcases your artistry and quirks. This code would stay with you for a while so design a plotting function that is general, while producing nice plots that would make your grandpa/ma proud.

5. Solve Problems 3.9 and 3.13 on Pages 85 and 86 in the aforementioned PDF.