

MSSE Prerequisite Study Materials

This guide to prerequisite material is for students who are missing the prerequisites to begin the program (programming, linear algebra, and multivariable calculus) or would like to brush up on their knowledge. This knowledge will be expected on day one of the program, so we recommend getting started as soon as possible to familiarize yourself with the material. You do not need to complete all courses listed, just be sure to cover the topics highlighted at the beginning of each section.

Programming

Students should come prepared with some coding experience. Knowledge of Python syntax is expected for the boot camp, such as variable assignment, conditional statements, loops, and functions. Here are some options we recommend to prepare.

Course	Cost	Notes
Coursera Python Certificate	Can audit for free (No certificate)	Covers basic Python needed for the boot camp, as well as Github which will be used in MSSE courses.
DataCamp Intro to Python	1st chapter free, monthly cost \$25 or less	Similar to Coursera with a slightly different format.
UC Berkeley D-Lab Python Fundamentals	Free	Live over Zoom. May 1st-3rd 2:00 PM - 4:00 PM PST. They have other workshops at D-lab too! This would be a good supplemental option in addition to other preparation materials.
UC Berkeley Extension Python Programming Course	\$995	This option has access to instructors, as well as multiple modality options.
Edx Harvard CS50	Free	This course goes above and beyond what is needed for the boot camp, but it is great for students who have the time and motivation and really want to work on their software engineering skills. Past MSSE students have recommended this course.

Linear Algebra

Linear algebra is an important prerequisite for DATA 200S, CHEM 281, CHEM 279, and CS C267. Students are expected to understand vectors, matrices, vector spaces, inner products, orthogonality, norms, linear independence, rank/nullity, invertibility, orthonormal matrices, projections, eigenvectors, eigenvalues, and solving sparse and dense linear systems. Here are some options we recommend to prepare.

Course	Cost	Notes
Khan Academy course	Free	
MIT OpenCourseWare	Free, but need to buy the book to get the assignments	Video lectures and assignments
3blue1brown Essence of Linear Algebra	Free	Not enough on its own to fulfill the requirements, but a good conceptual supplement for those who want to review
Local Summer Community College (California-Based Students)	Cost per unit varies	Great option for students who feel like their math skills are weaker. For non-US-based students, auditing or taking a course at your local college is a great option.
Distance Calculus Linear Algebra	\$1299 (\$443 per unit)	Online accredited course, take at your own pace with access to an instructor.

Multivariable Calculus

Multivariable calculus is an important prerequisite for CHEM 277B, CHEM 281, and CHEM 279. Students are expected to be familiar with vector functions, partial derivatives, multiple integrals, and vector calculus. We highly recommend a formal multivariable course for students. For those with a more extensive math background, Khan Academy or another online course should be sufficient. Here are some of the courses we recommend.

Course	Cost	Notes
Khan Academy	Free	If you have significant upper-level math experience (at least Calculus II) this may be a good option. If not, we would strongly recommend one of the below options.
Local Summer Community College (California-Based Students)	Cost per unit varies	Great option for students who feel like their math skills are weaker. For non-US-based students, auditing or taking a course at your local college is a great option.
Distance Calculus Multivariable	\$1732 (\$443 per unit)	Online accredited course, take at your own pace with access to an instructor.