What this course is about (1)

Mathematics for the computational problem-solver 😊

She/he starts with a real-world problem and …

• … builds an abstract, mathematical model of the problem,

• then invents algorithms that work on that model,

• then implements those algorithms into programs (software),

• then runs that software and gets abstract mathematical answers,

• and finally interprets those answers back in the real world.
What this course is about (2)

• ... builds an abstract, mathematical model of the problem,

This better be precise. We need mathematical concepts (objects) and their properties to describe the models. Concepts covered in Calculus are NOT enough. In this course we add Discrete Mathematics, with objects such as finite sets, bags, lists, strings, graphs, trees. To deal with such objects we need to be able to count them!

• then invents algorithms that work on that model,

These better be correct. We need mathematical proofs to be convinced of their correctness. In this course we learn to read/understand, and verify or find flaws in proofs, and finally come up with our own proofs.

• and finally interprets those answers back in the real world.

Sometimes these answers are approximations, and we need probabilities and statistics to interpret them. In this course we do a quick intro to probabilities.