

CS103ACE: What does the textbook cover?

The highly optional textbook for the first half of this class is “How to Read and Do Proofs”. Here is an overview of how this textbook aligns with course material.

First, note that “How to Read and Do Proofs” introduces topics that we will not cover in this class as a way of modeling proof techniques. As a result, the textbook only covers the mechanics of writing proofs, rather than the content of the math we’ll be writing the proofs about (i.e. set theory, functions, graphs, and so on). The textbook also uses some terms and stylistic conventions that we do not use. If you would rather read something tailored to this course, I would recommend looking through the Guides on the course website instead of reading the textbook.

The textbook also does not talk about anything from week 6 and beyond, when we will start talking about models of computation, computability, and complexity. For those topics I would recommend Sipser’s “Introduction to the Theory of Computation”, which is the other optional textbook.

With that said, “How to Read and Do Proofs” is very concise (most chapters are less than 10 pages) and it may be helpful to see different explanations for the lecture content!

Chapter(s)	Topic covered	Correspondence to CS 103
1	Truth table for “if P, then Q” statements	Lecture 3: Propositional Logic
2	Approaching proofs by working forward from what we have assumed and backwards from the statement we would like to prove	Not discussed in exactly the same way, but we’ll cover a similar way to organize your thinking around Week 3
4 and 5	Proving “there exists” and “for all” statements, respectively	Starting in Lecture 1, especially discussed in Lectures 4-5
6	Proof by induction	Week 5, Lectures 12-13
7	How to proceed when you assume a “for all” statement	Week 3
8 and 9	Proof by contradiction and proof by contrapositive	Lecture 2
10	Logical negations	Lectures 3-5

I don’t think Chapter 3 (on definitions and terms for sub-proofs) and 11 (on some other proof techniques) are super useful for the purposes of this class, but they may be interesting to read.