This classic text is revered by many mathematicians, although it seems less so by students. It is concise, clear, and thorough, and is still fresh today, thirty-five years after its last revision. Its main weakness today is its ridiculous cover price: nearly $300.

In present-day terms the book works best as a graduate text: it’s not especially difficult, nor does it go very deep, but there’s not much handholding and there are hardly any worked examples. Most of the exercise sections start with two or three relatively easy exercises, covering the kinds of results that would otherwise be worked examples. The remainder of the exercises are quite challenging and prove a lot of standard results. The prerequisites are modest, being mostly calculus and an introduction to real analysis. The book develops the properties of complex numbers, the line integral, and the needed point-set topology.

The book is slanted toward the geometric side, with a lot of material on conformal mapping, the Riemann mapping theorem, Dirichlet’s problem (the existence of a harmonic function having given boundary values), the monodromy theorem, and considerations of the kinds of regions that the Cauchy integral theorem holds for. It has relatively less coverage of power series, contour integrals, and infinite products. The coverage of special functions is concise but reasonably complete.

This is a pure-math book aimed at math majors and generally omits any applications, even to math. For example, it has a very nice section on the Riemann zeta function, but mentions only in passing that it is useful in analytic number theory, and nowhere uses the term “prime number theorem”.

The book concludes with two chapters on more specialized topics. One chapter is on elliptic (doubly-periodic) functions in general, and the Weierstrass $\wp$-function in particular. The other is on global analytic functions, that is, a way of formalizing multi-valued functions; the approach here is through sheaves. (Despite the geometric emphasis, the book makes only modest use of Riemann surfaces.)

I recommend against using this book as the text for a course, because of its high price. Wonderful though it is, you are only going to cover a small portion of the text in any course, and there are much cheaper though less comprehensive texts that do just as well for an introductory text. Needham’s Visual Complex Analysis is well-regarded by many people and also emphasizes the geometric perspective, although it is very different from any other text on the market. There are lots and lots of introductory complex analysis texts that lean toward the power series and integral side. Of these, I like Bak & Newman’s Complex Analysis and Fisher’s Complex Variables (the latter a bargain at under $20). Another well-regarded modern book, that I have not seen, is Boas’s Invitation to Complex Analysis.

Allen Stenger is a math hobbyist and retired software developer. He is an editor of the Missouri Journal of Mathematical Sciences. His mathematical interests are number theory and classical analysis.
Chapter 1: Complex Numbers
1 The Algebra of Complex Numbers
1.1 Arithmetic Operations
1.2 Square Roots
1.3 Justification
1.4 Conjugation, Absolute Value
1.5 Inequalities
2 The Geometric Representation of Complex Numbers
2.1 Geometric Addition and Multiplication
2.2 The Binomial Equation
2.3 Analytic Geometry
2.4 The Spherical Representation
Chapter 2: Complex Functions
1 Introduction to the Concept of Analytic Function
1.1 Limits and Continuity
1.2 Analytic Functions
1.3 Polynomials
1.4 Rational Functions
2 Elementary Theory of Power Series
2.1 Sequences
2.2 Series
2.3 Uniform Coverages
2.4 Power Series
2.5 Abel's Limit Theorem
3 The Exponential and Trigonometric Functions
3.1 The Exponential
3.2 The Trigonometric Functions
3.3 The Periodicity
3.4 The Logarithm
Chapter 3: Analytic Functions as Mappings
1 Elementary Point Set Topology
1.1 Sets and Elements
1.2 Metric Spaces
1.3 Connectedness
1.4 Compactness
1.5 Continuous Functions
1.6 Topological Spaces
2 Conformal Mapping
2.1 Arcs and Closed Curves
2.2 Analytic Functions in Regions
2.3 Conformal Mapping
2.4 Length and Area
3 Linear Transformations
3.1 The Linear Group
3.2 The Cross Ratio
3.3 Symmetry
3.4 Oriented Circles
3.5 Families of Circles
2.5 Stirling's Formula
3 Entire Functions
3.1 Jensen's Formula
3.2 Hadamard's Theorem
4 The Riemann Zeta Function
4.1 The Product Development
4.2 Extension of $\zeta(s)$ to the Whole Plane
4.3 The Functional Equation
4.4 The Zeros of the Zeta Function
5 Normal Families
5.1 Equicontinuity
5.2 Normality and Compactness
5.3 Arzela's Theorem
5.4 Families of Analytic Functions
5.5 The Classical Definition
Chapter 6: Conformal Mapping, Dirichlet's Problem
1 The Riemann Mapping Theorem
1.1 Statement and Proof
1.2 Boundary Behavior
1.3 Use of the Reflection Principle
1.4 Analytic Arcs
2 Conformal Mapping of Polygons
2.1 The Behavior at an Angle
2.2 The Schwarz-Christoffel Formula
2.3 Mapping on a Rectangle
2.4 The Triangle Functions of Schwarz
3 A Closer Look at Harmonic Functions
3.1 Functions with Mean-value Property
3.2 Harnack's Principle
4 The Dirichlet Problem
4.1 Subharmonic Functions
4.2 Solution of Dirichlet's Problem
5 Canonical Mappings of Multiply Connected Regions
5.1 Harmonic Measures
5.2 Green's Function
5.3 Parallel Slit Regions
Chapter 7: Elliptic Functions
1 Simply Periodic Functions
1.1 Representation by Exponentials
1.2 The Fourier Development
1.3 Functions of Finite Order
2 Doubly Periodic Functions
2.1 The Period Module
2.2 Unimodular Transformations
2.3 The Canonical Basis
2.4 General Properties of Elliptic Functions
3 The Weierstrass Theory
3.1 The Weierstrass p-function
3.2 The Functions $\zeta(z)$ and $\sigma(z)$
3.3 The Differential Equation
3.4 The Modular Function $\lambda(z)$
3.5 The Conformal Mapping by $\lambda(z)$

Chapter 8: Global Analytic Functions

1 Analytic Continuation
1.1 The Weierstrass Theory
1.2 Germs and Sheaves
1.3 Sections and Riemann Surfaces
1.4 Analytic Continuations along Arcs
1.5 Homotopic Curves
1.6 The Monodromy Theorem
1.7 Branch Points

2 Algebraic Functions
2.1 The Resultant of Two Polynomials
2.2 Definition and Properties of Algebraic Functions
2.3 Behavior at the Critical Points

3 Picard's Theorem
3.1 Lacunary Values

4 Linear Differential Equations
4.1 Ordinary Points
4.2 Regular Singular Points
4.3 Solutions at Infinity
4.4 The Hypergeometric Differential Equation
4.5 Riemann's Point of View

Index