**Qualifying Exam Topics and References for Financial
Mathematics at Florida State University**

Main textbook: Tomas Bjork - Arbitrage Theory in Continuous Time-
Oxford University Press, USA (4th edition-2020). Steven E. Shreve - Stochastic Calculus for Finance I - Springer (1st Edition-2003).
Complimentary textbooks: G. Anderson and A. Kercheval, Lectures on
Financial Mathematics: Discrete Asset Pricing. Martin Baxter and Andrew
Rennie, Financial Calculus, Cambridge Univ. Press, 1996. Arash Fahim -
Introduction to Financial Mathematics (Florida State University, 2019).

List of Topics and corresponding chapters in the main text book.

Chapter (Shreve)	Topic
Chapter 2	Finite probability spaces, random variables, distributions, expectations
Chapter 2	Conditional expectations, discrete-time martingale
Chapter 2	Discrete-time Markov processes
Chapter 5	Random walks, first passage time
Chapter (Bjork)	**Topic**
Chapter 2	One period, multiperiod, pricing of derivatives
Chapter 4	Measure theory, measurability
Chapter 4	Filtration and definition of Stochastic integral
Chapter 4	Conditional expectation and martingale property of stoc int
Chapter 4	Ito semimartingale, stochastic differential equations
Chapter 4	Quadratic variation, Ito's formula, and applications
Chapter 4	Stochastic integral of deterministic functions and multi D Ito
Chapter 5	SDE main theorem, geometric Brownian motion
Chapter 5	Properties of geometric Brownian motion and OU process, Inft gen
Chapter 5	Feynman Kac and Kolmogorov equations
Chapter 6	Self financing, Portfolio weights
Chapter 7	Contingent claims and arbitrage
Chapter 7	Deriving BS equation, BS formula for call
Chapter 7	Futures forwards, BS for futures
Chapter 7	Section 7.8-7.9, Hedging
Chapter 8-10	Hedging and incompleteness, Incompleteness-parity
Chapter 10	Greeks
Chapter 11	Martingale approach
Chapter 12	Mathematics of martingale approach
Chapter 12-13	BS from martingale approach
Chapter 25	Stochastic optimal control
Chapter 26-27	Optimal investment consumption