Computational Finance

Syllabus Information

CS 3930 - Computational Finance

Associated Term: 2023/24 Academic Session
Learning Objectives:

To understand the key role played by the advent of derivatives, financial instruments which facilitate managing financial risks. To understand pricing derivatives (and associated strategies of dynamic hedging) using advanced computational models are required. Introduction: financial markets; the rules of the game. Taxonomy of securities: main kinds of derivative securities and underlying markets. Mathematical techniques: Wiener process; diffusion processes as mathematical models of price dynamics; stochastic differential equations; computer simulations. Pricing and hedging in the Black-Scholes world: risk-neutral valuation; the Black-Scholes equation and analytic formulae; the "Greeks'' and their use. Beyond the Black-Scholes world: application issues; computational models; fractals and their use in finance. Efficient markets hypothesis: theory vs empirical evidence. Risk management: Value at Risk. Coursework Project: implementing valuation algorithms for different derivatives (e.g., in MatLab); solving numerical and theoretical problems. Learning Outcomes: demonstrate an understanding of mathematical and computational models of underlying and derivative securities master techniques for pricing derivatives and for dynamic hedging apply these models and techniques for creating computer programs
Required Materials: Click here for the reading list system
Technical Requirements: The total number of notional learning hours associated with course are 150. These will normally be broken down as follows: 33 hour(s) of Lecture(s) across 11 week(s) 117 hours of Guided Independent Study Formative Assessment: Coursework feedback Quizzes - automated feedback Summative Assessment: Examination (70%) 2 hours Portfolio (CW+Quizzes) (30%) 30 hours