ADVANCED OPTION PRICING

TOPICS OF THE COURSE:
The seminar will examine the following topics in advanced option pricing.
• Basic option pricing concepts. The opening session will review the basic Black- Scholes-Merton framework for pricing European call and put options under geometric Brownian motion. The distinction between the true conditional distribution and the "risk-neutral" distribution used in option pricing will be discussed, and justified on both no-arbitrage and equilibrium grounds.
• Exotic options. We will examine how to price exotic options under geometric Brownian motion: basic approaches, numerical methodologies, and pitfalls.
• Relaxing Black-Scholes-Merton. Time series- and options-based evidence against the assumptions underlying the Black-Scholes-Merton model will be discussed; in particular, the evidence of jumps and time-varying volatility. Four major alternative option pricing models will be presented and discussed: implied binomial trees, ARCH and stochastic volatility models, and jump-diffusion models.
• Calibrating and testing option pricing models. We will discuss how we select the parameter(s) of an option pricing model. Second, we will examine how we test whether options have in fact been fairly priced – i.e., whether option prices are consistent with the properties of the true conditional distribution.
• Hedging options positions. Issues in option hedging will be addressed from the perspective of a market maker actively engaged in writing options for corporate clients and institutional investors. Some failures in option risk management will also be discussed.
• Interest-rate options. The final session will focus on models developed for pricing options on interest-sensitive instruments, such as bonds and swap rates.

READING LIST:
Lecture notes