UBBFSEGA
Universitatea Babeș-Bolyai | Facultatea de Științe Economice și Gestiunea Afacerilor
FSEGA CLUJ-NAPOCA
UNIVERSITATEA BABEȘ-B
TRADIȚIE ȘI EXCELENȚĂ
Facultatea de Științe Economice și Gestiunea Afacerilor
Str. Teodor Mihali nr. 58-60
Cluj-Napoca, RO-400951
Tel.: 0264-41.86.52-5
Fax: 0264-41.25.70
econ@econ.ubbcluj.ro
www.econ.ubbcluj.ro

Subject: Pricing Derivatives and Markets

SYLLABUS

Topic 1. Financial derivatives
- 1.1. Definitions, typologies, trading
- 1.2. Financial derivatives market
- 1.3. Financial strategies using derivatives

Tematica 2. Financial arbitrage and financial derivatives valuation
- 2.1. No Arbitrage Opportunities principle (NAO)
- 2.2. No Arbitrage Opportunities theorem
- 2.3. Usual financial arbitrage relation
- 2.4. Futures and forward pricing

Tematica 3. Stochastic calculus in financial derivatives pricing
- 3.1. Brownian motion
- 3.2. Martingale
- 3.3. Stochastic integrals: Wiener and Ito
- 3.4. Ito's stochastic processes
- 3.5. Ito's lemma
- 3.6. Change of probability. Girsanov theorem

Tematica 4. Black-Scholes model of European option pricing
- 4.1. Non-paying dividend option pricing (Black-Scholes)
- 4.2. Paying dividend option pricing (Merton)
- 4.3. Futures option pricing (Black)
- 4.4. Currency option pricing (Garman-Kohlhagen) and Siegel's paradox
- 4.5. Balck-Scholes price's sensitivity indicators
- 4.6. Numerical procedure for using Black-Scholes in practice

Tematica 5. Static and dynamic hedging strategies
- 5.1. Delta neutral portfolios
- 5.2. Gamma neutral portfolios
- 5.3. Vega neutral portfolios
- 5.4. Risk neutral portfolios simultaneously

Tematica 6. Credit risk (Merton model)

6.1. Real options
6.2. Firm valuation with the Black-Scholes model
6.3. Probability to default

Tematica 7. Cox-Ross-Rubinstein model of European and American options pricing

7.1. Binomial process or binomial tree of price evolution
7.2. No risk portfolio method
7.3. Risk neutral valuation method
7.4. Applications on other underlying assets

Tematica 8. Fixed income assets pricing

8.1. Pricing methodology of zero-coupon bonds
8.2. Merton model
8.3. Vasicek model
8.4. Cox-Ingersoll-Ross model

References:

1. **John Hull**, Options, Futures, and Other Derivatives, Pentice Hall, New Jersey, 2006, Statele Unite
2. **John Hull**, Risk Management and Financial Institutions, Prentice Hall, New Jersey, 2007, Statele Unite
3. **Salih Neftci**, An Introduction to the Mathematics of Financial Derivatives, Academic Press, London, 2000, Marea Britanie
4. **Bogdan Negrea**, Evaluarea activelor financiare. O introducere in teoria proceselor stocastice aplicate in finante, Economica, Bucuresti, 2006, România
5. **Steven Shreve**, Stochastic Calculus for Finance, Springer, New York, 2004, Statele Unite