

## **FINA556 - Structured Products and Exotic Options**

### ***Course objectives***

This course discusses the product nature and hedging, pricing and risk management methodologies of the commonly traded exotic financial derivatives and asset backed securities in the financial markets. Special emphasis will be on exotic swaps, swaptions, credit default swaps, collateralized debt obligations, mortgage backed securities, convertible bonds, structured notes and hybrid products. Illustrative case studies of some real products will be provided.

### ***Text book***

“Options, Futures and other Derivatives” by John Hull, sixth edition (2006), Prentice Hall.

### ***Course instructor***

Professor Yue Kuen Kwok, Mathematics Department.

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### ***Course content***

#### ***Exotic swaps***

- Asset swaps
  - Hedge based pricing
- Short positions in defaultable bonds and total return swaps
  - Repo transactions
  - Uses of total return swaps
- Currency swaps
  - Exploiting comparative advantages
  - First deal between IBM and World bank
  - Differential swaps
- Swaptions and cancellable swaps
  - Call monetization and various trading strategies
  - Valuation of European swaptions
  - Auto-cancellable equity linked swaps
- Credit default swaps
  - Funding cost arbitrage
  - Counterparty risk
- Constant maturity swap products
  - Constant maturity swaps

### *Asset backed securities*

- Collateralized debt obligations
  - Arbitrage and balance sheet CDOs
  - Synthetic CDO
  - Valuation of CDO: diversity score
  - Default correlation on tranche values
  - CDO-squared
- Constant proportional debt obligations
  - Dynamic leverage mechanism
- Mortgage backed securities
  - Mortgage passthrough securities
  - Collateralized mortgage obligations
  - Prepayment risk in mortgage backed securities

### *Convertible bonds, structured notes and hybrid products*

- Convertible bonds as an asset class
  - Conversion, callable, reset and other features
  - Delayed call phenomena
  - Investors' perspectives on investment on convertible bonds
- Analytics of convertible bonds
  - Break-even calculations
  - Interest rate sensitivity and duration analysis
  - Dynamic programming in binomial calculations
  - Concepts of arbitrage and nature of risks
  - Hedging using common stocks and options
- Structured convertibles
  - Exchangeable convertible bonds
  - Convertible preferred stocks
  - LYONs (Liquid Yield) Options Notes
  - PEPS (Premium Exchangeable Participating Securities)
- Structured notes
  - Range notes
  - Target redemption notes
  - Volatility note
- Equity linked products – Asian examples
  - 2-Year USD Super Certificate Linked to Basket
  - 2-Year JPY Equity-Redeemable Warrant

## Grading policies

Two reading reports on technical papers on	
(i) collateralized debt obligations	
(ii) constant proportional debt obligations	2 x 10%
Two sets of homework assignment	2 x 10%
Two 75-minute in-class closed book tests	2 x 30%
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	Total = 100%

## Due dates

1 <sup>st</sup> homework	Sept 29 (Sat)
2 <sup>nd</sup> homework	Oct 20 (Sat)
1 <sup>st</sup> reading report	Oct 6 (Sat)
2 <sup>nd</sup> reading report	Oct 13 (Sat)

## Test dates

1 <sup>st</sup> test on Oct 6 (Sat)
2 <sup>nd</sup> test on Oct 27 (Sat) – last date of class