

## **FINA690K - Structured Products and Exotic Options**

### ***Course objectives***

This course will provide students with a basic understanding for the commonly traded financial derivatives and fixed income instruments in the financial markets. Special emphasis will be on callable and convertible bonds, interest rate linked structured products, mortgage backed securities, annuity products in insurance and collateralized debt obligations. Detailed explanations on the hedging, pricing and risk management methodologies will be included. Illustrative case studies of some real products will be provided.

### ***Pre-requisite***

FINA 551 – Options and Futures Markets or FINA 530 Advanced Derivatives Analysis

### ***Text book***

“Options, Futures and other Derivatives” by John Hull, fifth edition, Prentice Hall.

### ***Course instructor***

Dr Yue Kuen Kwok, Mathematics Department.

Office phone: 2358-7418, e-mail: [maykwok@ust.hk](mailto:maykwok@ust.hk)

Web page: <http://www.math.ust.hk/~maykwok/>

### ***Course content***

#### *Callable bonds and structured notes*

- Callable bonds
  - Monetization through swaption
- Structured notes
  - CMS notes
  - Digital ranges (corridor notes)
  - Equity-linked notes
  - Target redemption notes

#### *Convertible bonds*

- Convertible bonds as an asset class
  - Conversion, callable, reset and other features
  - Delayed call phenomena
  - Investors' perspectives on investment on convertible bonds
- Basic convertible bond calculations
  - Break-even calculations
  - Interest rate sensitivity and duration analysis
  - Dynamic programming in binomial calculations

#### *Mortgage backed securities and collateralized debt obligations (CDO)*

- Mortgage passthrough securities, collateralized mortgage obligations
- Prepayment risk in mortgage backed securities

- Cash flow CDO and synthetic CDO
- Valuation of CDO: diversity score

*Annuity products in insurance*

- Equity-linked annuities
  - Segregated funds
  - Dynamic fund protection
  - Participating policies
- Guaranteed annuity products
- Guarantee liabilities
  - Guaranteed minimum maturity benefit
  - Guaranteed minimum death benefit
  - Guaranteed minimum accumulation benefit
  - Guaranteed minimum withdrawal benefit

**Grading policies**

Reading reports on several technical papers on (i) convertible bonds, (ii) collateralized debt obligations, plus 3 sets of homework assignment