

Course Outline

Department of Accounting and Finance  
School of Business and Economics

**FNCE 3180-3**  
**Derivative Securities (3,0,0)**

**Calendar Description**

Students learn to value the main types of derivative securities and how to effectively utilize them in risk management, asset speculation and financial engineering. Topics include an introduction to forward and futures markets and hedging; mechanics of future markets; hedging with future contracts; theoretical and forward prices; introduction to options; calculating option contract profits; put-call parity and arbitrage bounds; option pricing models; exotic options; and swaps.

**Educational Objectives/Outcomes**

Upon completion of this course, the students will be able to:

1. Explain the mechanics of the futures and forward contracts.
2. Calculate profits or losses on future and forward contracts for hedgers and speculators.
3. Determine the futures prices for commodities and stock indices and describe how theoretical upward and lower bounds impact possible prices.
4. Discuss the mechanics of options contracts and the markets they trade in.
5. Calculate theoretical option prices using one and two-stage binomial models, as well as under the Black-Scholes model.
6. Demonstrate how put-call parity works in options markets.
7. Show how technical analysis can be used in a trading strategy for futures or options markets.
8. Assess the importance of interest rate and currency swap contracts in hedging.
9. Explain how credit default swaps potentially reduce risk.
10. Describe the characteristics of alternative derivative contracts such as weather derivatives, energy derivatives, swaptions, and exotic options.

**Prerequisites**

FNCE 2120 or FNCE 2121 or FNCE 3120 (grade of C+ or better); ECON 2330 or ECON 2331

**Co-requisites**

None

**Texts/Materials**

Hull, Options, Futures and Other Derivatives, 8<sup>th</sup> Edition, Pearson.

## Student Evaluation

Tests/quizzes	30-40%
Case studies/research projects/assignments	30%
Final exam	30-40%

Students must pass the exam to pass the course.

## Course Topics

1. An Introduction to Forward and Futures Markets and Hedging
  - Forward contracts
  - Futures contracts
  - Option contracts
  - Swap contracts
  - Other types of derivatives
  - Hedging versus speculation
  - History of derivative markets
2. Mechanics of Futures Markets
  - Price quotations
  - Opening and closing contracts
  - Features of futures contracts
    - Contract units, size, and asset specification
    - Delivery dates
    - Volume and open interest
    - Long and short positions
  - Profits and loss calculations
  - Hypothetical profits from long and short positions
3. Hedging with Future Contracts
  - Risks to be hedged
  - Use of margin: initial and variation
  - Short and long hedges
  - Basis risk
  - Cross hedging
  - Minimum variance hedge ratio
  - Hedging stock portfolios
4. Theoretical and Forward Prices
  - Continuous versus discrete time approximation of theoretical price
    - Pricing commodities
    - Pricing stock index futures
    - Pricing currency future
    - Return on commodities

- Spreads
  - Cost of carry and arbitrage bounds
  - Futures arbitrage
  - Discrete versus continuous approximation of bounds
  - Introduction to technical analysis
  - Trading strategies for future markets
    - Fundamental analysis versus technical analysis
    - Technical trading rules
      - Support and resistance
      - Moving average rules
      - RSI and channel rules
      - Chart patterns
    - Effectiveness of technical analysis: recent evidence
5. An Introduction to Options
- Mechanics of options markets
  - Put and call options on stocks
    - Strike price
    - Stock price
    - Option price
    - Volume and open interest
  - Profits and losses
6. Calculating Option Contract Profits
- Early exercise
  - Graphing payoffs
    - Put payoff
    - Call payoff
      - Combinations
        - Straddles and strangles
        - Bull and bear spreads
        - Calendar spreads
        - Butterflies and condors
        - Strips and straps
7. Put-call Parity and Arbitrage Bounds
- Factors affecting option prices
  - Put-call parity
  - Upper and lower bounds on stock options
  - Creation of synthetic securities
  - Impact of dividends on option prices and bounds
  - Bounds for current and index options
8. Option Pricing Models
- Binomial option pricing model
  - Riskless portfolio

- Risk neutral valuation
- One-stage binomial model
  - Binomial model for calls
  - Binomial model for puts
- Two-stage binomial model
- Black-Scholes option pricing model
  - Lognormal distribution and model assumptions
  - Inputs into the model
  - Estimating historical volatility
  - Implied volatility
  - VIX index
  - Greek letters and option prices
    - Delta
    - Gamma
    - Theta
    - Vega
    - Rho

#### 9. Exotic Options

- DerivaGem and online options calculators
- Definition of exotic options
  - Binary options
  - Forward start options
  - Gap options
  - Lookback options
  - Chooser options
  - Asian options
  - Shout options

#### 10. Swaps

- Interest rate swaps
- Currency swaps
- Comparative advantage swaps
- Determination of swap rates
- Credit default swaps and exotic derivatives

### Methods for Prior Learning Assessment and Recognition

As per TRU policy

### Attendance Requirements – Include if different from TRU Policy

As per TRU policy

### Special Course Activities – Optional

**Use of Technology – Optional**