University of Illinois, Urbana-Champaign *Professor Tim Johnson*
FIN 512 - Spring 2015 *tcj@illinois.edu*

Finance 512 – Financial Derivatives– Course Outline

This syllabus describes the topics to be covered during the term. Some material may be altered or expanded as the semester goes along. For general information about the class, see the handout `course_info.pdf` on the course Compass pages.

The lecture notes are the only text for the course. (They will be distributed each class and posted to the Compass site.) There is a packet of cases at the bookstore, which you should purchase. You do not need to purchase anything else. However, if you would like a reference work, I can suggest several recent textbooks. These are available on reserve in the library and at the bookstore.

- Options, Futures, and Other Derivatives by John Hull, 7th ed., Prentice Hall, 2009.
- Derivative Markets by Robert McDonald, 3rd ed., Addison Wesley, 2012.
- Derivatives: Markets, Valuation, and Risk Management by Robert Whaley, 1st ed., John Wiley, 2006.
- The Concepts and Practice of Mathematical Finance by Mark Joshi, 2nd ed., Cambridge University Press, 2008.
- Principles of Financial Engineering by Robert Kosowski and Salih Neftci, 3rd ed., Academic Press, 2014.

The syllabus below shows the sections of the text books which relate to the material covered in that lecture. This reading is not required.
An additional reference for more background on the markets and the role of financial engineering is:

- The Complete Guide to Capital Markets for Quantitative Professionals by Alex Kuznetsov, McGraw Hill, 2007.

Note the dates for the case discussions, which is when assignments are due. See `course_info.pdf` for details on these.

Schedule of classes:

1. **Tuesday, January 20.** **Introduction**
   Readings: *course information handout*

Part I : Forwards and Futures Markets

2. **Thursday, January 22.** **Forwards and Futures Contracts**
   Readings: Hull Ch. 5; McDonald Chs. 5,6,7.
3. **Tuesday, January 27.** **Futures vs Forwards**
   Case: *Mylan Laboratories* (Packet)

Part II : Swaps Markets

4. **Thursday, January 29.** **Principles of Swaps: Commodity Swaps, Currency Swaps**
   Readings: Hull Chs. 7, 32; McDonald Ch. 8; Whaley Ch. 4.

5. **Tuesday, February 3.** **Swaps: Evolving Infrastructure**
   Cases: *SEFs* (Compass)

6. **Thursday, February 5.** **Interest Rate Swaps, Return Swaps**

7. **Tuesday, February 10.** **Applications**
   Case: *Swap Spreads* (Compass) or *Grosvenor Group* (packet)

Part III : Options Markets

8. **Thursday, February 12.** **Options: Static Arbitrage Relations**

9. **Tuesday, February 17.** **Financing Arbitrage Positions**
   Case: *Quadriserve* (packet) or *Citigroup Preferred* (packet)

10. **Thursday, February 19.** **Curvature Restrictions and State-Price Densities**

11. **Tuesday, February 24.** **Dynamic Arbitrage and Stochastic Assumptions**
    Readings: Hull Chs. 11, 19.1-19.3; McDonald Chs. 10, 11
    Case: *S&P 500 futures options* (packet)

12. **Thursday, February 26.** **Continuous Time Arbitrage**
    Readings: Hull Chs. 12, 13, 17; McDonald Chs. 12, 13.5, 18, 20; Whaley Ch. 7.

13. **Tuesday, March 3.** **Applying the Theory**
    Case: *TARP Warrants* (packet)

14. **Thursday, March 5.** **Extending the Black-Scholes-Merton Results**
    Readings: Hull Ch. 15, 24.11; McDonald Chs. 12.2, 14.6, 22.6

15. **Tuesday, March 10.** **Application of Generalized Formulas**
    Case: *Arley Merchandise* (packet)

16. **Thursday, March 12.** **The Behavior of Volatility**
    Readings: Hull Chs. 18, 26.2; McDonald Ch. 23.

17. **Tuesday, March 17.** **Options Valuation with Stochastic Volatility**

18. **Thursday, March 19.** **Midterm Exam**

Part IV : Derivatives on Non-Traded Underlyings

19. **Tuesday, April March 31.** **Derivative Pricing with Multiple Sources of Risk**
    Readings: McDonald Chs. 19, 21; Hull Chs. 27.

20. **Thursday, April 2.** **Arbitrage in N Dimensions: Applications**

21. **Tuesday, April 7.** **Volatility Derivatives**
    Case: *VXX ETF (Compass)*

Part V : Credit Markets

22. **Thursday, April 9.** **Structural Models of Credit Risk**
    Readings: McDonald Chs. 15.1-15.3, 16.1, 27.1-27.3; Whaley Ch 12.

23. **Tuesday, April 14.** **Application of Structural Models**
    Case: *Apple bonds 2013* (Compass).

24. **Thursday, April 16.** **Single Name Credit Derivatives**
    Readings: Hull Chs. 23.1, 23.2; McDonald Ch. 27.4, Whaley Ch 19.

Part VI : Asset-Backed Products

25. **Tuesday, April 21.** **Multi-name Credit Derivatives: Introduction**
    Case: *Delphi* (packet)

26. **Thursday, April 23.** **Multi-name Credit Derivatives: CDOs**
    Readings: Hull Ch. 23; McDonald Ch. 27.4.

27. **Tuesday, April 28.** **Mortgage-backed Securities**
    Readings: Hull Ch. 31.3
    Case: *The London Whale.* (Compass)

28. **Thursday, April 30.** **Financial Engineering and the Subprime Crisis**

29. **Tuesday, May 5.** **Course review**

30. **Week of May 8-14** **Final exam**