

McDonough School of Business  
**Finc-255 Derivatives and Financial Markets**

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Office Hours: T, H 10:45am-12:15pm,  
and by appointment

**Prerequisites:** A full semester of Financial Management. Therefore, the student must have a good understanding of discounted cash flows. Additionally, the student should be comfortable with statistics (e.g. expected values, standard deviations and probability distributions) and be open to calculus concepts (e.g. differentiation, integration, e and natural logarithms.) Generally, students have also taken a corporate finance course and/or an investments course.

**Description:** This course program is designed to expand participants' understanding of derivative-related financial instruments (forwards, futures and options), and their use in investment and corporate financial management.

**Objectives:** To provide a basic understanding of derivatives and introduce the analytics of derivative valuation.

To provide practical and simple investment and corporate financial management strategies using derivatives in a manner which will allow students to apply these concepts and skills.

To practice meeting investment and corporate finance objectives with derivatives, using a series of examples.

**Required Notes:** The first two modules will be distributed in class. Subsequent modules are available on the MSB intranet:

<https://msb040.msb.edu/faculty/bodurthj/unrestricted/teaching/syllabus-undergrad.htm>.

as a hyperlink in the title of each section of in the course outline.

**Required Text:** You should buy the following book:

Hull, J., Options, Futures and Other Derivative Securities, 8<sup>th</sup> edition, Upper Saddle River, N.J., Prentice Hall, 2012, ISBN 9780132164948,  
(or Hull, J., Options, Futures and Other Derivative Securities, 7<sup>th</sup> edition, Upper Saddle River, N.J., Prentice Hall, 2008, ISBN 978013601586-4,  
or Hull, J., Options, Futures and Other Derivative Securities, 6<sup>th</sup> edition, Upper Saddle River, N.J., Prentice Hall, 2006, ISBN 013149908-4,  
or Hull, J., Options, Futures and Other Derivative Securities, 5<sup>th</sup> edition, Englewood Cliffs, N.J., Prentice Hall, 2003, ISBN 013009056-5,  
or Hull, J., Options, Futures and Other Derivative Securities, 4<sup>th</sup> edition, Englewood Cliffs, N.J., Prentice Hall, 2000, ISBN 013022444-8.)

(If you prefer to purchase the book alone, the accompanying CD is not necessary. Required class spreadsheet software is on the class web for download).

As the class-notes are in overhead form, you will need the text. The class note modules all have cross-references to the appropriate sections of the Hull book. It is also recommended that you keep up with the financial press. The [FT-US](#) and [WSJ](#) are good daily sources. The Wall Street Journal provides discount student subscriptions on a [quarterly](#) or a [semester](#) basis (click to access) -- as does the [FT for students](#). Weekly sources include [The Economist](#),

[Barron's](#), [Business Week](#), [Fortune](#), and [Forbes](#).

**Calculation:** The course will require a significant amount of calculation and/or computer spreadsheet work. Please always bring your financial calculator to class.

**Grading:** A series of quizzes will be given at approximately three week intervals through out the semester and during the assigned final exam period. A risk management project is also due on or before our final exam session, and a project work update is required at mid-semester. The grade weight of the final project is equal to two quizzes. The first review take-home quiz and the final exam period (project-related) quiz are both equal to 1/2 of a regular quiz.

As this course concerns derivatives, you earn two grading options by completing all quizzes. You will have the option to exclude one quiz from your final grade calculation (this "one quiz" may also be two half quizzes). Should you have an excused absence for a quiz, then you must complete the quiz as additional homework to apply the drop option to the associated quiz. Additionally, you will have the option to redo one quiz question on each quiz to earn back half of the points lost on the question. The options are inclusive, i.e. you have both options.

There will be *no quiz make-ups*. If, for some reason - like snow, a quiz must be *anceled for the entire class*, then the next quiz will count as a double quiz.

Our first take-home quiz is due at the beginning of the fourth class period, Tuesday - 1/24

Subsequent quizzes are scheduled as follows:

Tuesday - 2/2, Thursday - 2/23, Thursday - 3/22, Tuesday - 4/10, Thursday - 4/26.

The final exam session must be attended in one of the scheduled class times:

(See <http://registrar.georgetown.edu/12A/finalexams/index.htm> for summary information),

Tuesday 5/8 12:30 - 2:30 pm, and Wednesday 5/9 12:30 - 2:30 pm

and, when available, [http://registrar.georgetown.edu/12A/finalexams/exam\\_times.html](http://registrar.georgetown.edu/12A/finalexams/exam_times.html) for room.

Finally, on all quizzes subsequent to the first one, you earn 90 out of 100 quiz points for your work on the quiz. [You earn the additional 10 points by attending and participating in class during the roughly three weeks leading up to a quiz.](#) If you do miss a class or have negative participation, then I will evaluate your excuse out of 2-5 points per class. Obviously, there will be a sign-up sheet handed out for each class, and I ask you to sit in the same seat through out the semester.

There will be a series of **required** homeworks, from 1-4 per assignments per module. Homework will be distributed in class. The homeworks are also available on the class web site, as are suggested homework answers. Any homework that is unsatisfactory or missed will result in up to a 5 point penalty on the associated quiz. All homework should be turned in with the associated quiz.

In accordance with business school policy, class grades will be curved.

## Course Outline:

I recommend that you look over the sections in one of the following Hull books before the material is covered in class.

**Options 8th:** Hull, J., [Options, Futures and Other Derivative Securities](#), 7th edition,

**Options 7th:** Hull, J., [Options, Futures and Other Derivative Securities](#), 7th edition,

**Options 6th:** Hull, J., [Options, Futures and Other Derivative Securities](#), 6th edition,

**Options 5th:** Hull, J., [Options, Futures and Other Derivative Securities](#), 5th edition

or **Options 4th:** Hull, J., [Options, Futures and Other Derivative Securities](#), 4th edition.

Class notes, quizzes and homework are in \*.pdf or Adobe Acrobat form. If these files don't load when you click on the hyperlink line, then click for [Acrbobat download](#). Should you have trouble opening the "\*.pdf" files, your browser may require an adjustment that is described in this [Word document](#).

[Review: Time Value of Money and Interest Rates](#) (click on title link for pdf file),

[Extended Material - Appendix](#),

[Review with required answers: Time Value of Money and Interest Rates](#),

[Extended Material - Appendix with optional exercise answers](#)

Please focus on the first 18 pages of the Review handout. On page 18, exercises 1) and 2) are required. On page 19, exercise 3) will provide extra practice, as well the questions in the Appendix.

Also, three short write-ups extend the duration and convexity analysis:

[Analytic-Calculus Duration and Convexity](#), [Duration-Convexity\\_Use](#),  
and [Bond Convexity and Volatility Positions](#)

With regard to computation, the [Raterevw.xls](#) spreadsheet has an example of solutions.

The appendix should help you better understand all of the concepts, but officially it is "optional, but highly recommended." To see background work, you may click to download an associated spreadsheet: [Intgrte.xls](#) .)

Finally, an optional spreadsheet illustrates how to work off the benchmark Treasury yield curve (or term structure) to evaluate a risky project's cash flows by risk- and time- adjusted DCF - [Term\\_DCF\\_RP.xls](#).

Hull Textbook readings on this topic are limited:

**Options 7<sup>th</sup> and 8<sup>th</sup>:** 4.2-4.3 especially, 4.1-4.10, 6.1-6.2 (optional 6.3-6.4)

**Options 6<sup>th</sup>:** [4.2-4.3 especially, 4.1-4.10, 6.1-6.2 \(optional 6.5-6.6\)](#)

**Options 5<sup>th</sup>:** [pg. 42-44, 5.1-5.9, 5.13-5.15](#)

**Options 4<sup>th</sup>:** [pg. 50-53, 4.1-4.9, 4.13-4.15 \(optional Chapter 23-Credit Risk, esp. pp. 623-629\)](#)

| Current Quiz Practice | Suggested Answers |
|-----------------------|-------------------|
| Quiz-01a              | Quiz-01a          |
| Quiz-01b              | Quiz-01b          |

No homework with quiz. Redo is to be handed with next quiz.

Quiz-01

Quiz-01

Articles: [Bond Funds Take on \(High-Yield\) Risk To Lift Returns](#)  
[Muni \(Upward Sloping Curve\) Bonds Attract Arbs](#)

## [Notation: Abbreviations and Symbols](#)

### 1. [Forwards](#)

Options **6<sup>th</sup>**, **7<sup>th</sup>**, and **8<sup>th</sup>**: 1.3, 5.3-5.7

Options **5<sup>th</sup>**: [1.3, 3.4 - 3.8](#)

Options **4<sup>th</sup>**: 1.1, 3.1 (pp. 53-59) - 3.5

### 2. [Judgmental, Historical, and Regulatory Volatility](#) (click on title link for pdf file)

Options **8<sup>th</sup>**: 14.1-14.2, 14.4, 21.1, 22.1-22.2; optional 14.3, 21.2-21.3, 22.3-22.6

Options **7<sup>th</sup>**: 13.1-13.2, 13.4, 20.1, 21.1-21.2; optional 13.3, 20.2-20.3, 21.3-21.6

Options **6<sup>th</sup>**: 13.1-13.2, 13.4, 18.1, 19.1-19.2; optional 13.3, 18.2-18.3, 19.3-19.6

Options **5<sup>th</sup>**: 12.1-12.2, 12.4, 16.1, 17.1-17.2; optional 12.3, 12.12, 16.2-16.3, 17.3-17.6

Options **4<sup>th</sup>**: 11.1-11.3, 14.1-14.2, 15.1-15.2; optional 15.3-15.7

[Empirical Distribution vs. Normal Distribution Test with Sample Mean and Standard Deviation](#)

### 3. [Market Benchmarked Expectations, Volatility, and Price Value @ Risk](#) (click on title link for pdf file)

#### **Objectives**

To relate forward-futures price, risk premia, and expected spot prices

To understand price value @ risk concepts, and implement in practice

#### **Structure**

Forward-futures and expected market (inferred) spot

Price risk management application

Details: Price Value @ Risk

Options **8<sup>th</sup>**: 5.15, 21.1, 21.6-21.8 and 21.summary; optional Chapter 3, 21.4-21.5 and 21.9

Options **7<sup>th</sup>**: 5.15, 20.1, 20.6-20.8 and 20.summary; optional Chapter 3, 20.4-20.5 and 20.9

Options **6<sup>th</sup>**: 5.15, 18.1, 18.6-18.8 and 18.summary; optional Chapter 3, 18.4-18.5 and 18.9

Options **5<sup>th</sup>**: 3.15, 16.1, 16.6-16.8 and 16.summary; optional Chapter 4, 16.4-16.5 and 16.9

Options **4<sup>th</sup>**: 3.12, 14.2, 14.7-14.9, 14.summary

### 4. [Implied Volatility and Its Term Structure](#) (click on title link for pdf file)

**Objectives**

To understand how implied volatility is measured, its importance, and the patterns of option value implied volatility across time and future spot prices

**Structure**

Implied Volatility Exercises  
 Currency Option Pricing and Implied Vols [[OPTPRICE.XLS](#)]  
 Direction and Volatility Option Strategies  
 S&P 500 Volatility History  
 (Optional) S&P 500 option volatility "Smiles/Smirks"  
 [[OPTIMPVL.XLS](#), a variant of [OPTSIMPL.XLS](#)]

**Options 8<sup>th</sup>**: Chapters 14 (1-4, 8-9, 11)

**Options 6<sup>th</sup> and 7<sup>th</sup>**: Chapters 13 (1-4, 8-9, 11)

**Options 5<sup>th</sup>**: Chapters 12 (1-5, 8-9, 11), optional 16.4

5. [Forwards and Futures](#)

**Options 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup>**: 1.4, Chapter 2, 5.9-5.12; optional: 5.13- 5.14, 6.2-6.3, Chapter 7 (Not 5.Appendix proof)

**Options 5<sup>th</sup>**: 1.4, Chapter 2, 3.9-3.12; optional: 3.13- 3.14, 5.10-5.12, Chapter 6 (Not Appendix 3A proof)

**Options 4<sup>th</sup>**: 1.2, Chapter 2, 3.6-3.9; optional: 3.10- 3.11, 4.10-4.12 (Not Appendix 4A proof)

You should begin your [project work \(Module 11\)](#) with suggested assignments #I and, then, #1.

[Example for S&P 500 December Maturity \(SPZ7\) pdf](#)

6. [Option fundamentals: calls, puts, and underlying](#)

**Options 8<sup>th</sup>**: 1.5-1.7, Chapter 9 and 10

**Options 6<sup>th</sup> and 7<sup>th</sup>**: 1.5-1.7, Chapter 8 and 9

**Options 5<sup>th</sup>**: 1.5-1.7, Chapters 7 and 8

**Options 4<sup>th</sup>**: 1.3, 1.4, Chapters 6 and 7

7. [Option Positions and Strategies](#)

**Options 8<sup>th</sup>**: Chapter 11

**Options 6<sup>th</sup> and 7<sup>th</sup>**: Chapter 10

**Options 5<sup>th</sup>**: Chapter 9

**Options 4<sup>th</sup>**: Chapter 8

**Optional: [Structured Bond Products](#)** (+B-C, etc.)

**Options 8<sup>th</sup>**: 11.1, 14.10, 25.13, 26.4, 648-649

**Options 7<sup>th</sup>**: 294-296 566-567, 599-602, 647-648

**Options 6<sup>th</sup>**: 298-300, 520-523, 540-541, 614

**Options 5<sup>th</sup>**: 249-250, 445-456, 511

**Options 4<sup>th</sup>**: 253-254, 469-470, 533-534, 646-648

Also see, [Innovation in International Money and Bond Markets: A Source of Lower Borrowing Costs?](#)

## 8. [Black-Scholes-Merton Model Sensitivities](#)

**Options 8<sup>th</sup>**: Chapters 14 and 16; optional Chapter 18

**Options 7<sup>th</sup>**: Chapters 13 and 15; optional Chapter 17

**Options 6<sup>th</sup>**: Chapters 13 and 14; optional Chapter 15

**Options 5<sup>th</sup>**: Chapters 12 and 13; optional Chapter 14

**Options 4<sup>th</sup>**: Chapters 11 and 12; optional Chapter 13

Additional: [Chance, D., \*An Introduction to Derivatives\*, 4th ed., pp. 139-150](#)

[Cox-Rubinstein, \*Option Markets\*, 1985, 5.8, pp. 215-235](#)

## 9. [Binomial and Black-Scholes Option Valuation](#)

**Options 8<sup>th</sup>**: 12, 20.1-20.5; optional 13, 18.6-18.8

**Options 7<sup>th</sup>**: 11, 19.1-19.5; optional 12, 17.6-17.8

**Options 6<sup>th</sup>**: 11, 17.1-17.5; optional 12, 17.6-17.8

**Options 5<sup>th</sup>**: 10, 18.1-18.5; optional 11, 18.6-18.9

**Options 4<sup>th</sup>**: 9, 16.1-16.5; optional 10, 16.6-16.9

## 10. [Synthetic Options and the Cost of Insurance](#)

[Risk Management](#) - full text version

**Options 8<sup>th</sup>**: Chapters 3 and 21

**Options 7<sup>th</sup>**: Chapters 3 and 20

**Options 6<sup>th</sup>**: Chapters 3 and 18

**Options 5<sup>th</sup>**: Chapters 4 and 16

**Options 4<sup>th</sup>**: Chapter 14

## 11. Project Materials- [Overview](#) (pdf) ([Group Listing](#), [Alphabetical Listing](#))

[WSJ and Web-based Information on futures and options markets](#)

[Project Assignment #1](#) (pdf), [forecasts.org](#)

[Project Assignment-Web #2](#), (pdf intro)

[Project Assignment #3](#) (pdf)

## Announcements

From time to time, we'll have optional sessions on current topics. The link is the following:

## Current Events

### **Additional Suggested References -**

- Bodurtha, J. and Courtadon G., The Pricing of Foreign Currency Options, New York, Salomon Brothers Center, New York University, 1987-4/5.
- Chance, D., An Introduction to Derivatives, New York, Dryden, 1998.
- Cox, J. and M. Rubinstein, Options Markets, Englewood Cliffs, N.J., Prentice-Hall, 1985, ISBN 0136382053.
- Figlewski, S., W. Silber and M. Subrahmanyam, Financial Options, : From Theory to Practice, Homewood, Illinois, Business One Irwin, 1990, ISBN 1556232349.
- Jarrow, R.A. and A. Rudd, Option Pricing, Homewood, Illinois, Dow Jones-Irwin, 1983, ISBN 0870943782.
- Jarrow, R.A. and S. Turnbull, Derivative Securities, Cincinnati, Ohio, South-Western, 1996.
- McDonald, Derivatives Markets, Boston, MA, Addison-Wesley Publishing, 2002, ISBN: 0201729601
- Rubinstein, Mark, In-the-Money, <http://www.in-the-money.com/body.htm>, hard copy is Rubinstein on Derivatives, London, Risk Books, ISBN 1899332537.
- Stoll, H. and R. Whaley, Futures and Options: Theory and Applications, Cincinnati, Ohio, South-Western, 1993, ISBN 0538801158.

### **Derivatives Used in Practice -**

- Bookstaber, R.M., Option Pricing and Investment Strategies, Chicago, Probus, 1991, ISBN 1557381453.
- Burghardt, Galen, The Eurodollar Futures and Options Handbook, New York, McGraw-Hill, 2003, ISBN 0071418555.
- Gastineau, G.L., The Stock Options Manual, 3rd edition, New York, McGraw-Hill, 1988, ISBN 0070229813.
- Gatheral, Jim, The Volatility Surface: A Practitioner's Guide, Hoboken, Ny Finance, 2006, 9780471792512.
- Kolb, R.W., Financial Derivatives, Miami, Kolb Publishing, 1993, ISBN 1878975188.
- Kolb, R.W., Understanding Futures Markets, 3rd edition, Miami, Kolb Publishing, 1991, ISBN 187897503X.
- McMillan, L.G., Options as a Strategic Investment, 3rd edition, New York, New York Institute of Finance, 1993, ISBN 0136360025.
- Natenberg, S., Option Volatility and Pricing: Advanced Trading Techniques, 2nd edition, Chicago, Probus, 1994, ISBN 155738486X.
- Schwarz, E.W., Financial Futures: Fundamentals, Strategies and Applications, Homewood, Illinois, Irwin, 1986, ISBN 0256030057.
- Siegel, D.R. and D.F. Siegel, The Futures Markets, Chicago, Probus, 1990, ISBN 1557385726.
- Smith, Jr., C.W. and C.W. Smithson, The Handbook of Financial Engineering, New York, Harper & Row, 1990, ISBN 0887304486.
- Risk, From Black-Scholes to Black Holes, London, Risk, 1993, ISBN 0 9516453 31.
- Taleb, Nassim, Dynamic Hedging: Managing Vanilla and Exotic Options, New York, Wiley, 1997, ISBN-10 0471152803, ISBN-13 978-0471152804.
- Tompkins, R.G., Options Analysis, Chicago, Probus, 1994, ISBN 1557388342.

### **More technical -**

- Ingersoll, J., Theory of Financial Decision Making, Totowa, N.J., Rowman & Littlefield, 1987, ISBN 0847673596.
- Shimko, D., Finance in Continuous Time: A Primer, Miami, Kolb Publishing, 1992, ISBN 1878975072.
- Wilmott, Paul, J. Dewynne and S. Howison, Option Pricing: Mathematical Models and Computation, Oxford, Oxford Financial Press, 1993, ISBN 0952208202.

## **PostScript**

### Derivative Events

#### Enron

##### Highlights of Enron Documents