



# COLORADO STATE UNIVERSITY — GLOBAL —

## FIN 560: DERIVATIVES AND ASSETS PRICING

**Credit Hours:** 3

**Contact Hours:** This is a 3-credit course, offered in accelerated format. This means that 16 weeks of material is covered in 8 weeks. The exact number of hours per week that you can expect to spend on each course will vary based upon the weekly coursework, as well as your study style and preferences. You should plan to spend 14-20 hours per week in each course reading material, interacting on the discussion boards, writing papers, completing projects, and doing research.

**Faculty Information:** Faculty contact information and office hours can be found on the faculty profile page.

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### COURSE DESCRIPTION AND OUTCOMES

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**Course Description:**

This course provides a broad and detailed coverage of the derivatives markets including forwards, futures, swaps, and options. The role that derivative securities play in managing risk for multinational corporations, portfolio managers, and institutional investors is emphasized. Derivatives as speculative and hedging strategies are covered in detail.

**Course Overview:**

Welcome to FIN 560 - Derivatives and Assets Pricing. In this course, you will explore a broad introduction to the derivatives markets including forwards, futures, swaps, and options. Derivative securities play an integral part in managing risk for multinational corporations, portfolio managers, and institutional investors, as well as provide opportunities for speculators around the world. The goal of the course is to leave you with an understanding of various derivatives strategies and implications for portfolio management.

You will gain extensive knowledge of everything derivatives. You will learn about using derivatives as part of overall risk management strategy; types of derivatives (forwards, futures, swaps, and options) and their pricing; financial engineering; corporate applications; option valuation methods (binomial option pricing and Black-Scholes models); as well as the assumptions and rationale for these models. In addition, you will be able to apply knowledge gained in your professional and personal portfolio management.

**Course Learning Outcomes:**

1. Contrast the different types of financial markets as well as basic theories of derivatives and risk management.
2. Evaluate derivative forwards, futures, swaps, and options agreements.
3. Summarize financial risk-management strategies to support corporate and investment-planning processes and objectives.
4. Appraise asset-pricing models for options.
5. Estimate financial engineering security solutions for financial wealth creation.

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## PARTICIPATION & ATTENDANCE

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Prompt and consistent attendance in your online courses is essential for your success at CSU-Global. Failure to verify your attendance within the first 7 days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact your advisor.

Online classes have deadlines, assignments, and participation requirements just like on-campus classes. Budget your time carefully and keep an open line of communication with your instructor. If you are having technical problems, problems with your assignments, or other problems that are impeding your progress, let your instructor know as soon as possible.

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## COURSE MATERIALS

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### Required:

Sundaram, R., & Das, S. (2016). *Derivatives* (2nd ed.). New York, NY: McGraw-Hill Education, ISBN 978-0078034732

### Suggested:

None

**NOTE:** All non-textbook required readings and materials necessary to complete assignments, discussions, and/or supplemental or required exercises are provided within the course itself. Please read through each course module carefully.

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## COURSE SCHEDULE

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### Due Dates

The Academic Week at CSU-Global begins on Monday and ends the following Sunday.

- **Discussion Boards:** The original post must be completed by Thursday at 11:59 p.m. MT and peer responses posted by Sunday at 11:59 p.m. MT. Late posts may not be awarded points.
- **Critical Thinking:** Assignments are due Sunday at 11:59 p.m. MT.
- **Live Classroom:** Although participation is not required, Live Classroom sessions are held during Week 3 and Weeks 6. There are two total sessions.

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## WEEKLY READING AND ASSIGNMENT DETAILS

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### Module 1

#### Required Readings

- Chapters 1 & 5 in *Derivatives*
- Boucekine, R., Nishimura, K., & Venditti, A. (2017). Introduction to international financial markets and banking systems crises. *Journal of Mathematical Economics*, 68, 87-91.

## Recommended Readings

- Lan, L., Chen, C., & Chuang, S. (2015). Exchange rate risk management: What can we learn from financial crises? *Economic Modelling*, 45, 187-192.
- Zhao, J. L., Fan, S., & Yan, J. (2016). Overview of business innovations and research opportunities in blockchain and introduction to the special issue. *Financial Innovation*, 2(1). Retrieved from <https://jfin-swufe.springeropen.com/track/pdf/10.1186/s40854-016-0049-2>

## Discussion (25 points)

### Critical Thinking (90 points)

#### Option 1: Innovation in Finance

Read the article: Arthur, K. N. A. (2017). Financial innovation and its governance: Cases of two major innovations in the financial sector. *Financial Innovation*, 3(1). Retrieved from <https://link.springer.com/article/10.1186/s40854-017-0060-2>.

Discuss how innovation influences the financial industry and the derivatives market.

Complete your response in 4-5 pages (1200-1500 words) with 6 references (at least 4 scholarly/peer reviewed) using Microsoft Word or Excel. For calculations, you must show work to receive credit. Your well-written response should be formatted according to CSU-Global Guide to Writing and APA Requirements with any sources properly cited. Upload your completed work to the Week 1 Assignments page.

#### Option 2: Disruptive Innovation

Watch the video: Harvard Business Review. (2012). Disruptive Innovation explained [Video File]. Retrieved from <https://www.youtube.com/watch?v=qDrMAzCHFUU>

Discuss how disruptive innovation has played a major role in the growth of cryptocurrencies and the market..

Complete your response in 4-5 pages (1200-1500 words) and 6 references (at least 4 scholarly/peer reviewed) using Microsoft Word or Excel. For calculations, you must show work to receive credit. Your well-written response should be formatted according to CSU-Global Guide to Writing and APA Requirements with any sources properly cited. Upload your completed work to the Week 1 Assignments page.

## Module 2

### Required Readings

- Chapters 2, 3, & 7 in *Derivatives*

### Recommended Readings

- Bohl, M. T., Diesteldorf, J., & Siklos, P. L. (2015). The effect of index futures trading on volatility: Three markets for Chinese stocks. *China Economic Review*, 34, 207-224.
- Economic risk management cited as key driver of derivatives use in life insurance industry, according to Milliman report. (2016, Aug 16). PR Newswire.

## Discussion (25 points)

**Critical Thinking (90 points)**

**Option 1: Futures**

1. An investor enters into a short futures position in 10 contracts in gold at a futures price of \$276.50 per oz. The size of one futures contract is 100 oz. The initial margin per contract is \$1,500, and the maintenance margin is \$1,100.

- a. What is the initial size of the margin account?
- b. Suppose the futures settlement price on the first day is \$278.00 per oz. What is the new balance in the margin account? Does a margin call occur? If so, assume that the account is topped back to its original level.
- c. The futures settlement price on the second day is \$281.00 per oz. What is the new balance in the margin account? Does a margin call occur? If so, assume that the account is topped back to its original level.
- d. On the third day, the investor closes out the short position at a futures price of \$276.00. What is the final balance in his margin account? Ignoring interest costs, what are his total gains or losses?

2. The current price of gold is \$864 per troy ounce. Assume that you initiate a long position in 10 COMEX gold futures contracts at this price on 7-July-2016. The initial margin is 7% of the initial price of the futures, and the maintenance margin is 5% of the initial price. Assume the following evolution of gold prices over the next five days, and compute the margin account assuming that you meet all margin calls.

Date Price per Ounce	
7-Jul-16	\$864
8-Jul-16	\$860
9-Jul-16	\$858
10-Jul-16	\$852
11-Jul-16	\$842
12-Jul-16	\$840

Complete your response in 4-5 pages (1200-1500 words), with 6 references (at least 4 scholarly/peer reviewed), using Microsoft Word or Excel. For calculations, you must show work to receive credit. Your well-written response should be formatted according to CSU-Global Guide to Writing and APA Requirements with any sources properly cited. Upload your completed work to the Week 2 Assignments page.

## Option 2: Futures Case Study

Read the case study in your textbook, "GNMA CDR Futures Contract" (Sundaram & Das, 2016, pp. 41-44), and answer the following question:

How has this type of futures contract affected the U.S. derivatives market since its introduction? Discuss any changes, benefits, challenges from that time up to now.

Complete your response in 4-5 pages (1200-1500 words), with 6 references (at least 4 scholarly/peer reviewed), using Microsoft Word or Excel. For calculations, you must show work to receive credit. Your well-written response should be formatted according to *CSU-Global Guide to Writing and APA Requirements* with any sources properly cited. Upload your completed work to the Week 2 Assignments page.

## **Module 3**

### **Required Readings**

- Chapters 4 & 6 in *Derivatives*

### **Recommended Readings**

- Horchani, S. (2016). The effect of default and conversion options on bond duration. *The Journal of Fixed Income*, 25(3), 26-35.
- Panda, P., & Thiripalraju, M. (2015). Rise and fall of interest rate futures in Indian derivative market. *International Journal of Financial Management*, 5(1).

### **Discussion (25 points)**

### **Critical Thinking (90 points)**

#### **Option 1: Pricing Forwards and Futures**

Respond to the following questions:

Suppose there is an active lease market for gold in which arbitrageurs can short or lend out gold at a lease rate of 1%. Assume gold has no other costs/benefits of carry. Consider a three-month forward contract on gold.

If the spot price of gold is \$360/oz and the three-month interest rate is 4%, what is the arbitrage-free forward price of gold?

Suppose the actual forward price is given to be \$366/oz. Is there an arbitrage opportunity? If so, how can it be exploited?

A three-month forward contract on a non-dividend-paying asset is trading at \$95, while the spot price is \$82.

Calculate the implied repo rate.

Suppose it is possible for you to borrow at 8% for three months. Does this give rise to any arbitrage opportunities? Why or why not?

Complete your response in 4-5 pages (1200-1500 words), with 6 references (at least 4 scholarly/peer reviewed), using Microsoft Word or Excel. For calculations, you must show work to receive credit. Your well-written response should be formatted according to *CSU-Global Guide to Writing and APA Requirements* with any sources properly cited. Upload your completed work to the Week 3 Assignments page.

## Option 2: Interest Rate Derivatives

Respond to the following questions:

On a \$1,000,000 principal, 91-day investment, what is the interest payable if we use an Actual/365 basis?

What is the interest if the basis is Actual/360?

If the six-month interest rate is 6% and the one-year interest rate is 8%, what is the rate for the FRA over the period from six months to one year? Assume that the number of days up to six months is 182 and from six months to one year is 183.

Complete your response in 4-5 pages (1200-1500 words), with 6 references (at least 4 scholarly/peer reviewed), using Microsoft Word or Excel. For calculations, you must show work to receive credit. Your well-written response should be formatted according to CSU-Global Guide to Writing and APA Requirements with any sources properly cited. Upload your completed work to the Week 3 Assignments page.

## Live Session (0 points)

### Module 4

#### Required Readings

- Chapters 8, 9, & 10 in *Derivatives*

#### Recommended Readings

- Bhat, A., & Arekar, K. (2015). An empirical test of efficiency of exchange-traded currency options in India. *Business and Economics Research Journal*, 6(4), 1-17.
- Mitra, S. (2017). Efficient option risk measurement with reduced model risk. *Insurance Mathematics and Economics*, 72, 163-174.

## Discussion (25 points)

### Critical Thinking (90 points)

#### Option 1: Option Strategies and Implementation

Please respond to the following questions while elaborating on your insight and providing external support.

You are managing a separate portfolio dedicated to your retirement income. You do not wish to take excessive risk, and would prefer to limit the downside. What common option structure would suffice and how would you implement this structure to protect the portfolio's value?

A bullish call spread is bullish on direction. Is it also bullish on volatility?

What is the volatility view implied by a long horizontal call spread?

What about a short horizontal put spread?

Complete your 4-5 page (1200-1500 words) response using Microsoft Word. Include 6 references (at least 4 scholarly/peer reviewed). Your well-written response should be formatted according to CSU-Global Guide to

Writing and APA Requirements with sources properly cited. Upload your completed work to the Week 4 Assignments page.

### **Option 2: Put-Call Parity**

Please respond to the following questions while elaborating on your insight and providing external support.

Explain why a European call on a stock that pays no dividends is never exercised early. What would you do instead to eliminate the call option position?

A stock is trading at  $S = \$60$ . There are one-month American calls and puts on the stock with a strike of  $\$60$ . The call costs  $\$2.50$  while the put costs  $\$1.90$ . No dividends are expected on the stock during the options' lives. If the one-month rate of interest (annualized) is 3%, show that there is an arbitrage opportunity available and explain how to take advantage of it. Is there a manner to set-up a model to assess and identify arbitrage opportunities such as this one?

Complete your 4-5 page (1200-1500 words) response using Microsoft Word. Include 6 references (at least 4 scholarly/peer reviewed). Your well-written response should be formatted according to CSU-Global Guide to Writing and APA Requirements with sources properly cited. Upload your completed work to the Week 4 Assignments page.

## **Module 5**

### **Required Readings**

- Chapters 23, 24, & 25 *Derivatives*

### **Recommended Readings**

- Allen, K. (2016). Financial performance impacts compensation options. *ASHRAE Journal*, 58(2), 26-28, 30, 32.
- Oberoi, J. (2018). Interest rate risk management and the mix of fixed and floating rate debt. *Journal of Banking & Finance*, 86, 70–86.

### **Discussion (25 points)**

#### **Portfolio Milestone (25 points)**

This week, submit an outline of your Portfolio Project. Submit this to the instructor by email by the end of the week. Your outline should be a Word document and you will list the major headings and sections of your paper. This draft is a required component of the Portfolio Project assignment, due this week. Points will be deducted from your final grade on the Portfolio Project if you fail to submit this assignment by week's end.

## **Module 6**

### **Required Readings**

- Chapters 11, 12, & 13 in *Derivatives*

### **Recommended Readings**

- Girone, G., & Manca, F. (2016). The mean difference for lognormal distribution. *Applied Mathematics*, 7(9), 824–828. Retrieved from [http://file.scirp.org/pdf/AM\\_2016052613371580.pdf](http://file.scirp.org/pdf/AM_2016052613371580.pdf)

### **Discussion (25 points)**

## **Live Classroom (0 points)**

### **Critical Thinking (90 points)**

#### **Option 1: Delta and Risk-Neutral Pricing**

Please respond to the following questions while elaborating on your insight and providing external support:

Explain the concept of the delta of an option.

Give an example of a derivative where the delta may be either positive or negative for different ranges of the stock price. Please explain in detail.

Provide an understanding of risk-neutral pricing including how it works and how it can be used.

Complete your 4-5 page (1200-1500 word) response using Microsoft Word. Include 6 references (at least 4 scholarly/peer reviewed). Your well-written response should be formatted according to CSU-Global Guide to Writing and APA Requirements with sources properly cited. Upload your completed work to the Week 6 Assignments page.

#### **Option 2: Binomial Option Pricing**

Please respond to the following questions while elaborating on your insight and providing external support:

Holding all else constant, if dividends increase, does the difference between American calls and puts increase or decrease? Why? What about the difference between European calls and puts?

Explain in a heuristic manner why option replication on a binomial tree is a “dynamic” strategy. Expand your thoughts by providing external support that helps to provide further insight into the use of binomial trees.

Complete your 4-5 page (1200-1500 word) response using Microsoft Word. Include 6 references (at least 4 scholarly/peer reviewed). Your well-written response should be formatted according to CSU-Global Guide to Writing and APA Requirements with sources properly cited. Upload your completed work to the Week 6 Assignments page.

## **Module 7**

### **Required Readings**

- Chapters 14, 15, 16, & 17 in *Derivatives*

### **Recommended Readings**

- Folger, J. (n.d.). Options pricing: Modeling. Retrieved from <https://www.investopedia.com/university/options-pricing/modeling.asp>
- Glazyrina, A., & Melnikov, A. (2016). Bernstein’s inequalities and their extensions for getting the Black–Scholes option pricing formula. *Statistics and Probability Letters*, 111, 86-92.
- Kiesel, R., & Rahe, F. (2017). Option pricing under time-varying risk-aversion with applications to risk forecasting. *Journal of Banking and Finance*, 76, 120-138.

### **Discussion (25 points)**

## **Module 8**

### **Required Readings**

- Chapters 20 & 30 in *Derivatives*

### **Recommended Readings**

- Lin, S. K., Wang, S. Y., Chen, C. R., & Xu, L. W. (2017). Pricing range accrual interest rate swap employing LIBOR market models with jump risks. *The North American Journal of Economics and Finance*, 42, 359–373.
- Luiz, E. G., Tabajara, P. J., Fabiano, G. L., & Carlos, A. G. B. (2015). Value-at-risk in times of crisis: An analysis in the Brazilian market. *African Journal of Business Management*, 9(5), 223–232. Retrieved from <https://academicjournals.org/journal/AJBM/article-abstract/A82EE4D51252>

### **Discussion (25 points)**

### **Portfolio Project (350 points)**

#### **Option 1: Derivative Instruments & Financial Engineering**

Financial managers make use of derivatives, such as options, forwards, futures, and swaps as the basis for a financial risk management strategy. These derivatives all play a role in this process and provide the company instruments that can be used to mitigate risk.

Please select one of the following derivative instruments:

- Forward/futures contracts
- Swaps
- Options
- Collars.

For the selected instrument can you please provide the following information:

- Detailed explanation of the instrument
- How it can be used as part of a hedging program
- Limitations of the instrument
- The regulatory environment surrounding this instrument included required disclosures, etc.
- How this instrument is priced.

The goal of this project is to provide a comprehensive overview of this specific instrument that could be used as a user's guide for future risk management professionals as they consider the use of this instrument as part of their financial risk management strategy.

Your total project should be 8-10 pages long. Spend time to ensure that the formatting complies with CSU-Global Guide to Writing and APA Requirements and thoroughly proofread and grammar-check your final product. Review the Portfolio Project grading rubric in the Module 8 folder. Ensure you have both a title and reference page and 12 references (at least 10 are scholarly/peer reviewed). The CSU-Global Library is a great

place to find these sources! Your references must be credible and be formatted according to CSU-Global APA guidelines. Upload your completed work to the Module 8 folder.

### **Option 2: Development of a Corporate Risk Management/Hedging Policy and Strategy**

One of the primary practical uses of derivatives in the market is the use by multinational corporate to hedge against risk based on the operations, investments, and financing activities. For corporations to engage in financial hedging there are a number of items that must be in place in terms of the development of a policy, strategy development, and finally, developing a process that will be used on an ongoing basis to implement hedging and monitor progress.

You have just been hired as the Treasurer of a major multinational manufacturing company that has operations and sales in over 10 countries. The nature of the business has resulted in revenues generated in a number of currencies, supplies purchased globally in many currencies, and a capital structure which includes financing attained (via bonds and bank loans) in a number of different countries across the globe. The primary reason that you were hired is that the incumbent Treasurer did not put a risk management process in place which has resulted in some rather large income statement hits over the past few years.

Your goal as the new Treasurer is to implement this new policy and initiate the hedging process. To do so, you will need to address the following items:

- Why does a company require a formal risk management policy?
- What factors should be considered in the development of this policy?
- How do we translate the policy into an affecting global strategy?
- Regarding the corporation, based on their profile, what types of risks are likely in place?
- Which derivatives should we consider as part of our hedging approach? Which should be excluded and why?
- Which tools can we use to assess our risk profile as a company?

Your total project should be 8-10 pages long. Spend time to ensure that the formatting complies with CSU-Global Guide to Writing and APA Requirements and thoroughly proofread and grammar-check your final product. Review the Portfolio Project grading rubric in the Module 8 folder. Ensure you have both a title and reference page and 12 references (at least 10 are scholarly/peer reviewed). The CSU-Global Library is a great place to find these sources! Your references must be credible and be formatted according to CSU-Global APA guidelines. Upload your completed work to the Module 8 folder.

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**COURSE POLICIES**

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**Course Grading**

20% Discussion Participation

45% Critical Thinking Assignments

35% Final Portfolio Project

<b>Grading Scale</b>	
A	95.0 – 100
A-	90.0 – 94.9
B+	86.7 – 89.9
B	83.3 – 86.6
B-	80.0 – 83.2
C+	75.0 – 79.9
C	70.0 – 74.9
D	60.0 – 69.9
F	59.9 or below

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## **IN-CLASSROOM POLICIES**

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For information on late work and incomplete grade policies, please refer to our **In-Classroom Student Policies and Guidelines** or the Academic Catalog for comprehensive documentation of CSU-Global institutional policies.

### **Academic Integrity**

Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /repurposing your own work (see CSU-Global Guide to Writing & APA for percentage of repurposed work that can be used in an assignment), unauthorized possession of academic materials, and unauthorized collaboration. The CSU-Global Library provides information on how students can avoid plagiarism by understanding what it is and how to use the Library and internet resources.

### **Citing Sources with APA Style**

All students are expected to follow the CSU-Global Guide to Writing & APA when citing in APA (based on the most recent APA style manual) for all assignments. A link to this guide should also be provided within most assignment descriptions in your course.

### **Disability Services Statement**

CSU-Global is committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Disability Resource Coordinator at 720-279-0650 and/or email [ada@CSUGlobal.edu](mailto:ada@CSUGlobal.edu) for additional information to coordinate reasonable accommodations for students with documented disabilities.

**Netiquette**

Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults, or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom. If you have concerns about something that has been said, please let your instructor know.