

ENG MGT 6213 / SYS ENG 6613 - Financial Engineering

Course Syllabus

Fall 2022 Semester

Course Overview

ENG MGT 6213 / SYS ENG 6613 is an introduction to financial engineering, with an emphasis on financial derivatives and financial risk management. Topics include the futures market, the pricing of forwards and futures, forward rate agreements, interest and exchange rate futures, swaps, the options market, option trading strategies, the binomial and Black-Scholes models for option valuation, sensitivity analysis using the option Greeks, volatility forecasting using GARCH and EWMA, and portfolio Value-at-Risk (VaR). Prerequisites include ENG MGT 5210, ENG MGT 6211, or equivalent.

Room and Meeting Time: Room 201, Engineering Management, blended/online synchronous Zoom meetings and recordings available for both on-campus and distance students Tuesday/Thursday, 12:30-1:45 pm central (live attendance is not required)

Instructor: David Enke

enke@mst.edu

Office: Engineering Management 221

Phone: 573-341-4749

Hours: By appointment or when in office

Text: No formal textbook will be required for this course. Most course material will come from the instructor lecture notes and various online resources. Nonetheless, the instructor will be referencing some material from the textbook “Options, Futures, and Other Derivatives,” 10th Edition, John C. Hull, *Prentice Hall*, 2017, ISBN-13: 978-0134472089.

Software: Microsoft Excel

Grading: 4 Take-home tests (100 points each) for 400 points total

Reading and take-home tests will be made in class. Late take-home tests will be accepted for a maximum of two days after the original due date. An amount of 10% will be deducted from the test for each day it is late. Makeup tests will not be allowed after the assigned dates (except for extenuating circumstances). The instructor must approve makeup tests that result from schedule conflicts at least one week prior to the test. In most instances the student will be expected to take any makeup tests early. The instructor reserves the right to drop a student from the course or deduct points from the student's final grade due to excessive unexcused absences.

Course Requirements

Students may need to use the Excel software package during the course. Students will benefit from previous exposure to basic accounting, economics, statistics, and finance, although previous knowledge of each subject is not required. Please see the prerequisites listed in the course overview.

Course Material

Class notes, take-home tests and solutions will be posted on Canvas (<https://umsystem.instructure.com/>). Students will be instructed during the first class period on how to utilize the Canvas classroom web site. The lecture notes are in Adobe Acrobat pdf format. One, two, three, and six slide per page formats are available. Students can use Adobe Acrobat Reader (<http://get.adobe.com/reader/>) to view the slides.

The lecture schedule (<http://web.mst.edu/~enke/courses/ENGMGT6213>) contains a listing of the topics discussed during each class period. Students will be notified by email, through Canvas, or alerted in class when significant changes are made to the lecture schedule.

Course Topics

Below are the topics that are to be covered in ENG MGT 6213 / SYS ENG 6613, given adequate time:

- Introduction to Options and Futures
- The Futures Market and Central Counterparties
- Hedging Strategies Using Futures
- Interest Rates, Interest Rate Futures, and Interest Rate Swaps
- Determination of Forward and Future Prices
- The Options Market
- Properties of Stock Options, Calls and Puts
- Trading Strategies Involving Options
- Binomial Trees for Options Valuation
- The Black-Scholes-Merton Model for Options Valuation
- Option Sensitivity Using the Greek Letters
- Volatility Forecasting Using EWMA and GARCH
- Portfolio Value-at-Risk (VaR)

Test Schedule

Topics for each take-home test will be announced in class and are posted on the lecture schedule. The instructor reserves the right to change test due dates to better accommodate the students and/or coverage of the material. Students will be provided ample warning of test date changes. Open book, open note, take home tests are due on the following dates (available online at least one week before they are due):

Test 1: Due Tuesday, September 27th, 2022, by 12:00 pm noon central

Test 2: Due Thursday, October 20th, 2022, by 12:00 pm noon central

Test 3: Due Thursday, November 10th, 2022, by 12:00 noon pm central

Test 4: Due Thursday, December 8th, 2022, by 12:00 noon pm central

Grading Scale

The following grading scale will be used for graduate students. The instructor reserves the right to modify the scale.

90-100% (A letter grade); 80-89.9% (B); 70-79.9% (C); Below 70% (F)

Statement about Copyright, FERPA, and Use of Video

It is vitally important that our classroom environment promote the respectful exchange of ideas. This entails being sensitive to the views and beliefs expressed during discussions whether in class or online. Please speak with me before recording any class activity. It is a violation of University of Missouri policy to distribute such recordings without my authorization and the permission of others who are recorded. More information is provided online (<https://www.umsystem.edu/ums/elearning/policies>).

Well-Being and UCARE (<https://go.mst.edu/ucare-report>)

Any of us may experience strained relationships, increased anxiety, feeling down, alcohol/drug misuse, decreased motivation, challenges with housing and food insecurity, etc. When your mental well-being is negatively impacted, you may struggle academically and personally. If you feel overwhelmed or need support, please make use of S&T's confidential mental health services (<https://wellbeing.mst.edu/>) at no charge. Health and well-being resources (<https://wellbeing.mst.edu/resources/browse-resources/>) are also available. If you are concerned about a friend or would like to consult with a Care Manager, please make a UCARE referral for support and assistance. <https://stuaff.mst.edu/ucare/>.

Student Honor Code and Academic Integrity

The Honor Code all students are expected to follow can be found at the following link: <http://stuco.mst.edu/honor-code/>. Page 30 of the Student Academic Regulations handbook describes the student standard of conduct relative to the University of Missouri System's Collected Rules and Regulations section 200.010, and offers descriptions of academic dishonesty including cheating, plagiarism and sabotage (<http://registrar.mst.edu/academicregs/index.html>), all of which will be reported to the Vice Provost for Academic Support. Additional guidance including the University's Academic Dishonesty Procedures is available at <http://academicsupport.mst.edu>. Other resources for students regarding ethics and integrity can be found at the following link: <http://academicsupport.mst.edu/academicintegrity/studentresources-ai>.

Accessibility and Accommodations

It is the university's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on a disability, please contact Student Disability Services at (573) 341-6655, sdsmst@mst.edu, visit <http://dss.mst.edu/> for information.

Nondiscrimination, Equity, and Title IX

Missouri University of Science and Technology is committed to the safety and well-being of all members of its community, and to creating an environment free from discrimination and harassment.

The University does not discriminate on the basis of race, color, national origin, ancestry, religion, sex, pregnancy, sexual orientation, gender identity, gender expression, age, disability, protected veteran status, and any other status protected by applicable state or federal law. As used in this policy, the word “sex” is also inclusive of the term “gender.”

Additionally, US Federal Law Title IX states that no member of the university community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Violations of this law include sexual harassment, sexual assault, dating/domestic violence, and stalking.

In accordance with The Collected Rules and Regulations University of Missouri, Missouri S&T requires that all faculty and staff members report, to the Missouri S&T Equity Officer, any notice of discrimination disclosed through communication including but not limited to direct conversation, email, social media, classroom papers and homework exercises.

Missouri S&T’s Equity Officer and Title IX Coordinator is Chief Diversity Officer Anitra Rivera. Contact their office at (573) 341-6038, or 203 Centennial Hall, to report violations of the university’s nondiscrimination policies, including Title IX. To learn more about resources and reporting options (confidential and non-confidential) available to Missouri S&T students, staff, and faculty, please visit <http://titleix.mst.edu>.

Classroom Egress Maps

For all in-person instruction, faculty should explain where the classroom emergency exits are located. Classroom egress maps are posted at <http://designconstruction.mst.edu/floorplan/>.