Wagner College

Financial Risk Modeling, FI 606 Spring 2024

Wed 6:00PM-8:00PM in Horrmann library

Instructor: Dr. Zhexu (Edward) Ai **E-mail:** zhexu.ai@wagner.edu
Office Hours: By appointment

Course Description

The objective of this course is to provide a practical introduction to the most important financial models and show how these models can be applied using Excel. In this course, we will:

- Learn the fundamental theories and models in corporate finance and investments, such as time value of money, interest rate risk for bonds, capital asset pricing model and Gordon growth model for stocks, Binomial model and Black-Scholes model for option pricing, and the minimum variance frontier, the optimal risky portfolio, and capital allocation line for portfolio management. We will also introduce Monte Carlo simulation and the concept of Value at Risk (VaR).

- Implement these models in Excel to solve basic financial problems.

Detailed examples will be given in class. We will use Excel a lot for this course, so contact me for office hours when you have problems. Do not accumulate questions until the exam. The course is very intensive, but hard work pays off.

Textbook and Other Materials

- Simon Benninga and Tal Mofkadi, **Financial Modeling**, *Fifth Edition, MIT Press*
- Lecture slides will be uploaded on Moodle
- Current financial or economics news: The Wall Street Journal, Bloomberg, Financial Times, The Economist, Barron's, etc.

Course Contents

- Preparation: Introduction to Excel and Time Value of Money
- Part 1: Valuation of Bonds
- Part 2: Valuation of Stocks
- Part 3: Option Pricing
- Part 4: Portfolio Management
- Part 5: Monte Carlo Simulation and Value at Risk (VaR)

Prerequisites

- Basic knowledge of probability and statistics (mean, variance, covariance, correlation etc.)
- Working knowledge of Excel

- Math knowledge such as matrix multiplication

Statement on Academic Integrity

Wagner College faculty strongly believes that academic integrity is a corner stone in the educational process. All students should familiarize themselves with the rules and regulations found in the Wagner Student Academic Honesty & Integrity Handbook (https://wagner.edu/academics/wp-content/blogs.dir/22/files/2013/01/HHandbook.pdf). Any student suspected of plagiarism or academic dishonesty will be immediately sent to the Academic Honesty Committee, comprised of both faculty and student representatives, that hear cases of academic dishonesty. If you are found in violation of the student honor code, at minimum, you will receive an "F" grade in this course.

Regarding AI tools such as ChatGPT, I encourage students to use them when having difficulties (but make sure you cite the tools you have used). Entirely relying on such tools will be treated as plagiarism.

Professionalism

The ability to act professionally and to communicate in an appropriate manner is critical to success in any career field. Failure to act in a professional manner will have repercussions on your course grade. Professionalism is measured as a combination of attendance and class participation. Expectations of behavior and course conduct:

- Arrive on time for every class and do not leave early.
    - Offer your classmates and the professor the respect and courtesy of not disrupting the learning environment or experience by being late or leaving early. Inform the professor (via email) of any unforeseen circumstances.
- Attend every class
    - Every class builds on what we've learned in the previous class. If you miss a class, you will fall behind pretty quickly. Special circumstances are excused with documentation.
- Be present and participate.
    - Complete readings and pre-work and come ready to participate. Be an active learner which includes active contributions to in-class discussions and in-class activities.
- Be respectful and courteous.
    - Listen and let your colleagues finish before jumping in. Please be thoughtful and considerate in your response.
    - Hostility and rudeness to classmates or the professor, in and out of the classroom, are unacceptable and are not tolerated. Calling your professors by their first names (in person or via emails) is inappropriate. Same for other words such as "bro".

Guidelines For Accommodations for Students with Disabilities

Wagner College values accessibility as part of its commitment to diversity and inclusion and has a continuing commitment to providing reasonable accommodations for students with disabilities. Students with disabilities and/or learning difficulties who may need accommodations in order to fully participate in this class are encouraged to contact the instructor and Danae Choquette in Academic Advising and Accessibility (718-390-3278; danae.choquette@wagner.edu) so that the

necessary accommodations can be made ahead of time. For more information about accessibility and the available accommodations, visit Wagner College's Office of Academic Advising and Accessibility homepage (https://wagner.edu/aaa/accessibility-services/).

Grading

Attendance, Participation and Pop Quizzes	20%
Individual Assignments	25%
Group Project	25%
Final Exam	30%
Total	100%

Attendance, Participation and Pop Quizzes

- There will be 4 pop quizzes which count towards your attendance and participation.
- Your lowest quiz score will be dropped so if you miss one quiz, your grade will not be affected.
- If you are unable to attend a class, send me an email before the class.

Individual Assignments

- There are 6 to 8 individual assignments in this course. Discussion with your classmates is encouraged. However, everyone must submit their own work.
- Rename the homework assignment as "firstname_lastname_X.xlsx". Where "X" is the homework assignment number.
- Clearly display and format your solutions in Excel and put your name on the front page. Poorly displayed or formatted files will result in lower grades.
- The assignment will be due one week after it is announced.
- Make sure to email me your assignments by the due date and time. Late submission is NOT accepted.

Definition of Late Assignment Submissions: Assignments submitted after the deadline without me granting extensions prior to the deadline to specific students are late submissions.

Note: A late assignment submission will get a 20% grade deduction if you are within 1 week late, or 50% deduction if you are more than 1 week late.

Group Project

- Most of the class requires the use of quantitative methods to value different instruments. The project will allow you to think about the qualitative aspects of stock selection or portfolio construction.

- You have two options for the group project, choose one.
    1. Stock Pitch
    2. Portfolio Pitch
- Your grade will be based on your presentation (to the class) and your submission (to me).
- Stock Pitch
    - The stock pitch requires you to think about why a company is expected to outperform the market.
    - In class, we will discuss how to read company regulatory filings, how to analyze company's competitive position in the market and make informed choices about the assumptions we build into valuation models.
    - Pitch the stock to the class (presentation). Analyze the story behind the stock (market analysis, competitive analysis, strategy…)
    - Use as many methods as possible to compute the fair price of the stock (in excel and email it to me)
- Portfolio Pitch
    - The portfolio pitch will force you to think about who your investors are and what they need from you. We will see that the CAPM does not work in reality and that there are a lot of assumptions and biases built into how you construct a portfolio that consistently outperforms the market.
    - In class, we will discuss the objective of creating a portfolio, how to back-test performance and extract the sources of "alpha".
    - Sell a portfolio construction methodology to the class (why should we give you money, how is your portfolio different from the market, does it outperform the market, does it have lower volatility…)
    - Do a detailed historical analysis of your portfolio methodology (in excel/R/python and email it to me)

Final exam

- Exam will be in person and closed-book, but a one double-sided, A4-size sheet of handwritten notes is allowed. Students should not communicate with or interrupt anyone else during the exam.
- A significant portion of the questions on the exam are closely related to those in homework and projects.

Missed Exams – It is your responsibility to make every effort to ensure you are present for the examinations. **Unexcused absences will result in a grade of 0% and will be closely monitored by me**. I will report missed exams or long-term absence to the school or college if necessary. If you have a conflict, please discuss it with me as far in advance as possible. In general, make-up exams are only offered in the event of extenuating. And there is no credit deduction for makeup exams. Note that the final exam may be scheduled on any day during finals week, and you are

responsible for taking the exam during the scheduled time. I strongly recommend you not to wait too long to take the make-up exam.

Grade Determination:

Letter Grade	Numerical Grade
A	>=93
A-	90-92.99
B+	87-89.99
B	83-86.99
B-	80-82.99
C+	77-79.99
C	73-76.99
C-	70-72.99
D+	67-69.99
D	63-66.99
D-	60-62.9
F	<60

- This is for every grade given during the course as well as the final grading policy.

Tentative Schedule of the Course

Week1	Introduction and Excel
Week2	Time Value of Money
Week3	Bond Valuation: Introduction to Bond Pricing
Week4	Bond Valuation: Duration and Convexity
Week5	Stock Valuation I: Dividend Discount Model
Week6	Stock Valuation II and III: Free Cash Flow and Equity Valuation
Week7	Option Pricing: Introduction to Options, Option Strategies
Week8	Option Pricing: Binomial Model, Black-Scholes Model
Week9	Option Pricing: Binomial Model, Black-Scholes Model
Week10	Portfolio Management I and II: Two Risky Assets
Week11	Portfolio Management III and IV: Multiple Risky Assets
Week12	Monte Carlo Simulation with an application of VaR
Week13	Presentations
Week14	Finals Review, Exam