Finance & Risk Engineering

SPRING 2025
FRE-GY 6951 I ▶ Sustainable Investment
Friday, 6PM – 8:41PM
2 MetroTech Center, 802, Brooklyn

Instructor Information

- **Lecturer:** Bruno G. Kamdem, Ph.D.
- **Contact:** bgk8384@nyu.edu; (410) 772-3948.
- **Office Hours:** Before and after class or by appointment (in-person or virtually)

Course Information

- **Prerequisite:** Graduate standing.
- **Credits:** 1.5.
- **Term:** January 21 – March 11 (1st half).

- **Description:**
ESG factors are becoming central to investment strategies as stakeholders push for more transparency and accountability from companies. This trend is enhanced by the use of artificial intelligence (AI), which is critical for identifying and managing new ESG risks such as bias in sustainability assessments and complex regulatory compliance. Python is essential for these tasks due to its strength in data analysis, automation, and machine learning. Its capability to process large datasets enables deeper and more dynamic ESG evaluations, improving investment strategies and risk management. As a result, there is a growing demand for professionals skilled in both Python and ESG principles. These professionals are suited for high-paying roles, which offer competitive salaries due to the specialized skills required. Combining Python abilities with ESG knowledge not only boosts earning potential but also opens doors to impactful contributions in sustainability projects. Students will gain personal satisfaction and professional advancement in sustainability roles. They may also lead startups that develop ESG solutions, such as software for better ESG reporting or platforms that help companies enhance their sustainability practices. The expanding ESG solutions market provides numerous opportunities for innovation and entrepreneurship. By mastering Python and ESG principles, students will effectively navigate the intersection of technology and sustainability, pursuing diverse and meaningful career paths in finance and investment. This course prepares students with the essential skills to thrive in this evolving economic landscape, driven by technological and sustainability advancements.

- **Course Learning Outcomes:**
  1. Understand the key concepts and drivers of sustainable finance. Apply Python to conduct basic data analysis on sustainability metrics.
  2. Analyze different ESG scoring methodologies using Python to handle and process ESG data. Evaluate the effectiveness of various ESG metrics in reflecting organizational sustainability.
  3. Apply Python to model the financial impacts of ESG factors on asset prices and portfolio returns. Analyze and synthesize the results to predict future trends using Python-based machine learning techniques.

4. Understand various sustainable finance products and their market roles. Create Python scripts to analyze the financial viability and impact of these products.

5. Evaluate the social and environmental impacts of investments using Python to process relevant data. Design a Python-based framework to assess impact investment outcomes.

6. Explain the significance of biodiversity in sustainable investment. Utilize Python to analyze data on biodiversity metrics and their correlations to business performance.

7. Assess the role of corporate engagement and voting policies in promoting ESG principles. Develop Python tools to monitor and report on shareholder engagement outcomes.

- **General Course Requirements:**
  This course will be structured around a variety of interactive and instructional components, which will serve as the core of the learning experience:
  - **Weekly in-Person Lectures:** These will provide foundational knowledge and facilitate in-depth discussions on key concepts.
  - **Weekly Assignments:** These will include weekly homework assignments to practice, apply, and evaluate the acquired knowledge.
  - **Term Group Project:** This project will allow students to demonstrate their deep understanding of ESG principles and their proficiency in Python programming, preparing them for high-impact roles in the finance sector.
  - **Weekly Group Presentations:** : Presentations will require students to analyze different components of sustainable finance and ESG factors, reinforcing the knowledge acquired through lectures and readings. By preparing and delivering presentations, students actively engage with the material, which helps solidify their understanding and retention of complex concepts.
  - **Guest Speakers:** Occasional presentations by industry experts to align theoretical knowledge with practical industry applications, giving students a comprehensive understanding of the skills required to succeed in the financial engineering industry.

  Please refer to the Course Schedule (see page 8) for detailed information on assignments and deadlines.

- **Materials:**
  - REQUIRED TEXTBOOKS:
    1. Perspectives in Sustainable Equity Investing, Guillaume Coqueret, 2022, CRC Press, 1st Edition, ISBN: 9781032071015, Web Link.
  - RECOMMENDED TEXTBOOKS:
    1. Data Engineering with Python: Work with Massive Datasets to Design Data Models and Automate Data Pipelines Using Python, Paul Crickard, 2020, Packt Publishing, 1st Edition, ISBN: 978-1839214189, Web Link.

- **Readings:**
  Weekly slides and materials will be distributed to students in advance on *NYU Brightspace*. Additional readings and links to relevant resources will be regularly posted on *NYU Brightspace*. See Page 7 for the list of some preassigned readings.
  - **Suggested Additional Readings:** Suggested readings are footnoted throughout the weekly course slides and will also be posted on *NYU Brightspace*.

- **Resources:**
  - Access to course materials: NYU Brightspace.
  - Databases, journal articles, miscellaneous: Bern Dibner Library.
  - Collection of business research resources: NYU Business Library.
  - 24/7 technology assistance:
    * Tandon IT Help Desk: soehelpdesk@nyu.edu, (646) 997-3123.
    * NYU IT Service Desk: AskIT@nyu.edu, (212) 998-3333.

- **Course Expectations:**
Students are expected to review weekly slides and readings prior to class. Attendance is crucial, and students should come prepared to engage, participate, and ask questions about any concepts they do not fully understand from the lecture notes and in-class lab sessions. All assignments are due by 11:59 PM on Sunday (see the full Course Schedule on page 8). Assignments must be submitted on time through NYU Brightspace for grading. It is important to dedicate the necessary time and effort to this course to achieve the expected outcomes by the end of the term. If you encounter any challenges during the semester, please inform me promptly. Additionally, contact me if you anticipate missing a class. I am available and ready to support your success.

Performance Evaluation

① **Class Presentations:**
Weekly presentations are designed to equip students with the tools they need to excel in interviews and perform effectively in their professional roles. Additionally, these presentations will enhance students' understanding, critical thinking, and application of concepts covered in the corresponding lecture. The presentations offer an opportunity to explore practical applications, current trends, and real-world examples within the realm of this course. **Each presentation must directly connect to the main theme or topic described in the course schedule, ensuring a cohesive and thorough exploration of the course material** (see the full Course Schedule on page 8). This weekly drill will promote active learning and encourage independent research among students. Where applicable, insights into current market trends, developments, or news that align with the week's topic should be included. This encourages staying informed about the dynamic nature of financial markets. For further insights and detailed information, you are encouraged to consult with a librarian. Students will be pre-assigned to groups of three or four, depending on the class size. It is recommended to prepare for every class in study groups, whether or not there is a group assignment. Each group will lead a brief 10 to 15-minute verbal discussion at the beginning of each class on the first class of the week. Presentations will be graded in real-time. To earn full credit, you will need to follow the class presentation grading rubric that will be provided later on NYU Brightspace. Sources for weekly presentations should be serious and credible references such as The *Wall Street Journal*, the *Financial Times*, *Bloomberg*, the *Economist*, ⋯. The University is already subscribed to most credible journals. You can find them directly linked on the NYU Libraries website under "Articles & Databases" → "Business" → "Articles, News, & Working Papers" or "Company & Financial Information" (*Bloomberg*).

② **Group Term Project:**
The group project for this course aimed at seamlessly integrating this course learning goals with practical applications, preparing students for the evolving demands of the financial sector while positioning them as future leaders in sustainability. Through this project, students will examine the intricate relationship between ESG principles and financial analysis, applying these insights to enhance investment strategies and outcomes. They will harness Python's powerful data manipulation and analysis capabilities to perform deep evaluations of ESG factors and their financial implications, and employ artificial intelligence to identify and manage biases in sustainability assessments, ensuring adherence to stringent ESG regulations.

The group project also aims to provide students with hands-on experience, enhancing their attractiveness to potential employers. By working with real-world data sets, students will simulate the types of data they are likely to encounter in industry settings. The project includes a written report and a live graded in-class presentation. To ensure the quality and relevance of the project report and presentation, evaluations by experts will be utilized to provide effective feedback. Adherence to the provided group project grading rubrics is necessary to achieve a perfect score. Specific instructions on the group project, including detailed guidelines and grading rubrics, will be provided later in the term and posted on NYU Brightspace.

Students are expected to form their own groups beginning in the first week of classes, preferably con-

sisting of three members from diverse backgrounds, and have their subject and group pre-approved by the professor before the initial proposal date. The group project accounts for a significant amount of the final grade, highlighting its significance in the overall course assessment. See Table 1 below for grading distribution and defined deadline. Ultimately, the group project is designed to enhance students' analytical skills and prepare them for successful careers in financial engineering.

Table 1

Form groups, choose topic	starts on	Week 1
Initial Group Project Proposal	5%	Week 2
Revised Group Project Proposal	3%	Week 3
Final Written Group Project Report	15%	Week 6
Group Project Presentation	7%	Week 7

③ **Weekly Assignments:**
There will be 5 weekly homework assignments (see the full Course Schedule on page 8) aimed at reinforcing key concepts and ensuring progressive mastery of knowledge conveyed in the course. Each assignment is designed to build upon the week's lessons. These assignments are essential for developing the hands-on experience necessary to succeed in financial engineering roles, as well as to prepare students for competitive job opportunities or entrepreneurial ventures in the field. All assignments should be submitted electronically (preferred) on *NYU Brightspace* by 11:59pm on the due date unless stated otherwise (see the full Course Schedule on page 8) for full credit. Attendance is expected at each class meeting. If you have to miss a class for family or health obligation, notify me in advance. A class roster will be taken before the start of each class. Consistent and constructive class participation may result in a student's grade being rounded up if very close to a higher letter grade once the curve is complete. Please, regularly check for new announcements on *NYU Brightspace*.

④ **Grading:**

Homework	30%	weekly
Group Presentation	10%	weekly
Midterm Exam	15%	week 4
Term Group Project	30%	week 1 – week 7
Final Exam	15%	week 7
TOTAL	**100%**	

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\begin{aligned}
&\texttt{if grade} \geq 95\% \Leftrightarrow \texttt{4.00:A} \\
&\texttt{else if } 90\% \leq \texttt{grade} \leq 94.99\% \Leftrightarrow \texttt{3.67:A-} \\
&\texttt{else if } 87.5\% \leq \texttt{grade} \leq 89,99\% \Leftrightarrow \texttt{3.33:B+} \\
&\texttt{else if } 82.5\% \leq \texttt{grade} \leq 87.49\% \Leftrightarrow \texttt{3.00:B} \\
&\texttt{else if } 80\% \leq \texttt{grade} \leq 82.49\% \Leftrightarrow \texttt{2.67:B-} \\
&\texttt{else if } 77.5\% \leq \texttt{grade} \leq 79.99\% \Leftrightarrow \texttt{2.33:C+} \\
&\texttt{else if } 72.5\% \leq \texttt{grade} \leq 77.49\% \Leftrightarrow \texttt{2.00:C} \\
&\texttt{else if } 70\% \leq \texttt{grade} \leq 72.49\% \Leftrightarrow \texttt{1.67:C-} \\
&\texttt{else if } 67.5\% \leq \texttt{grade} \leq 69.99\% \Leftrightarrow \texttt{1.33:D+} \\
&\texttt{else if } 62.5\% \leq \texttt{grade} \leq 67.49\% \Leftrightarrow \texttt{1.00:D} \\
&\texttt{else if } 60\% \leq \texttt{grade} \leq 62.49\% \Leftrightarrow \texttt{0.67:D-} \\
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Academic Misconduct

(A) **Introduction (School of Engineering Student Code of Conduct):** The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon

the School and will not be tolerated. Furthermore, those who breach the School's rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School's Policy on Academic Misconduct available here.

(B) **Definition:** Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to the following:

1. **Cheating:** intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.

2. **Fabrication:** including but not limited to, falsifying experimental data and/or citations.

3. **Plagiarism:** intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.

4. **Unauthorized collaboration:** working together on work that was meant to be your own.

5. **Duplicating work:** : presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.

6. **Forgery:** altering any academic document, including, but not limited to academic records, admissions materials, or medical excuses.

Inclusion Statement
The NYU Tandon School values an inclusive and equitable environment for all our students. I hope to foster a sense of community in this class and consider it a place where individuals of all backgrounds, beliefs, ethnicities, national origins, gender identities, sexual orientations, religious and political affiliations, and abilities will be treated with respect. It is my intent that all students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. If this standard is not being upheld, please feel free to speak with me.

Religious Accommodations
NYU's Policy on Academic Accommodations for Religious Holidays and Observances states that students may, without penalty, excuse themselves from academic obligations and otherwise receive a reasonable accommodation when required for religious and spiritual holidays and observances. You must notify me in advance of religious holidays or observances that might coincide with exams, assignments, or class times to schedule reasonable alternatives. Students may also contact religiousaccommodations@nyu.edu for assistance.

Inclement Weather
In the event that weather or other disruptions close the campus, we will meet at our regular time on Zoom. The link is here: https://nyu.zoom.us/profile.

Unexpected Events
You may encounter unforeseen family, health, or other issues during the semester which create circumstances that prevent you from meeting course requirements. In this case, please raise the issue(s) directly with **Deanna Rayment** in the Office of Student Affairs at (646) 997-3046 or deanna.rayment@nyu.edu before requesting any accommodation from me.

Disability Disclosure Statement

Academic accommodations are available for students with disabilities. Please contact the **Moses Center for Students with Disabilities (CSD)** at (212) 998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at `www.nyu.edu/csd`. The Moses Center is located at 726 Broadway on the 2nd floor.

Readings

	MANDATORY		RECOMMENDED
WEEK1	<u>Perspectives in Sustainable Equity Investing:</u> <u>1th Edition</u>:	<u>Data Engineering with Python:</u>	Chapter 3, pp. 46-51
WEEK 2	<u>Perspectives in Sustainable Equity Investing:</u> Section 2.1 <u>1th Edition</u>:	<u>Data Engineering with Python:</u>	Chapter 5, pp. 104-114
WEEK 3	<u>Perspectives in Sustainable Equity Investing:</u> Sections 5.1-5.2 <u>1th Edition</u>:	<u>Data Engineering with Python:</u>	Chapter 5, pp. 114-128
WEEK 4	<u>Perspectives in Sustainable Equity Investing:</u> Sections 4.2, 4.3, 4.6, 47 <u>1th Edition</u>:		
Week 5	<u>Perspectives in Sustainable Equity Investing:</u> Sections 3.1 - 3.3 <u>1th Edition</u>:		
WEEK 6	<u>Perspectives in Sustainable Equity Investing:</u> Section 1.3 <u>1th Edition</u>:		
WEEK 7	<u>Perspectives in Sustainable Equity Investing:</u> Sections 6.1 6.2 <u>1th Edition</u>:		

Course Schedule

TOPICS	LECTURE	ASSIGNMENTS
Week 1 (Tue, Jan 21 – Sun, Jan 26) • Guest Speaker • INTRODUCTION TO SUSTAINABLE FINANCE Definitions Responsible and Ethical Investing ESG Ecosystem & Regulatory Framework The Market of ESG Investing	Fri, Jan 24 (6:00 PM – 8:41 PM)	Homework 1 DUE o Review Class Syllabus o Welcome email (confirm reception) o Plan and organize Weekly Group Presentations o Discuss Group Term Project
Week 2 (Mon, Jan 27 – Sun, Feb 2) • ESG SCORING Data and Variables Scoring System Rating System	Fri, Jan 31 (6:00 PM – 8:41 PM)	Homework 2 DUE Initial Group Project Proposal DUE o Weekly Group Presentation 1
Week 3 (Mon, Feb 3 – Sun, Feb 9) • IMPACT OF ESG INVESTING ON ASSET PRICES AND PORTFOLIO RETURNS Theoretical Models Empirical Results Cost of Capital	Fri, Feb 7 (6:00 PM – 8:41 PM)	Homework 3 DUE Revised Group Project Proposal DUE o Weekly Group Presentation 2
Week 4 (Mon, Feb 10 – Sun, Feb 16) • SUSTAINABLE FINANCIAL PRODUCTS ESG Mutual Funds Green and Social Bonds Sustainable Alternative Assets	Fri, Feb 14 (6:00 PM – 8:41 PM)	Midterm Exam
Week 5 (Mon, Feb 17 – Sun, Feb 23) • IMPACT INVESTING Definition Sustainable Development Goals The Market of Impact Investing An Example With the Biodiversity Risk	Fri, Feb 21 (6:00 PM – 8:41 PM)	Homework 4 DUE o Weekly Group Presentation 3
Week 6 (Mon, Feb 24 – Sun, Mar 2) • ENGAGEMENT & VOTING POLICY Active Ownership ESG Voting	Fri, Feb 28 (6:00 PM – 8:41 PM)	Homework 5 DUE Final Written Group Project Report DUE o Weekly Group Presentation 4
Week 7 (Mon, Mar 3 – Tue, Mar 11) • Guest Speaker • EXTRA-FINANCIAL ACCOUNTING	Fri, Mar 7 (6:00 PM – 8:41 PM)	o Group Term Project (Presentation) o Final Exam