

**NYU****TANDON SCHOOL
OF ENGINEERING**

Finance & Risk Engineering

SPRING 2022

FRE 6951-GY A ► Sustainable Investments

Friday, 2PM – 4:41PM

Rogers 214, 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, [Zoom link](#), 9476 6014 597 (ID).

Teaching Assistant

- **Name:**
- **Contact:**
- **Office Hours:**

Course Information

- **Prerequisite:** Graduate standing.
- **Credits:** 1.5.
- **Term:** 1st half: 1/24/2022 – 3/21/2022.

- **Description:**

China recent opening of a national carbon emissions trading market is generating an unprecedented momentum for sustainable investing. The global carbon market was worth \$125 billion in 2000 and could eventually reach €1.4 trillion according to Bloomberg New Energy Finance. The impact of ESG investing on asset pricing in the corporate bond market is getting more and more acute. Furthermore, large institutions such as insurance companies, pension funds, wealth management, retail investors, and sovereign wealth funds are investing significantly in ESG strategies. Corporate green bonds are becoming more and more prevalent, particularly in industries where the environment is financially tangible to firm operation. A sustainable finance economy whose contours are gradually taking shape is emerging. In this new climate economy, substantial wealth will be created by firms that get in front of the opportunities but lost by firms that discount the potentials ahead. Consequently, there is an urgent need to develop a graduate skills base that can serve growing employer demand for expertise in the area of sustainable investing. This course provides a foundation in sustainable investing and a detailed understanding of sustainable financing products. In addition to elucidating on how carbon markets work, the course also provides the analytical tools for appraising the effectiveness and efficiency of carbon markets as policy instruments for mitigating climate change. We will also cover the role of impact investing, sustainability-linked strategies, and the identification of SRI investment funds.

- **Learning Goals:** This course aims at the following key goals:

1. Recognize ESG scoring and explain ESG performance in the stock market and the corporate bond market.

2. Identify and explain SRI investment funds, green bonds, social bonds, and other sustainability-linked strategies.
3. Implement climate risk modelling and critically explain the implications of the regulation of climate risk. Understand and explain the factors driving portfolio management with climate risk.
4. Understand and explain the economics of carbon trading, market participants and carbon financial instruments, and the rationale for carbon pricing. Describe and critically evaluate the challenges of carbon leakage (windfall profits, illiquidity, volatility).
5. Understand and discuss the policy of Emissions Trading Schemes (ETS) in terms of market stability reserve solutions (hedging, banking, borrowing).

- **Structure:**

Weekly in-person lectures, student presentations, expert panel discussions (through guest speakers) will constitute the core of this course. Weekly homework assignments, a project, a midterm, and a final exam will frame the course. Refer to the Course Schedule (see page 6) for specific details on the course assignments and deadlines.

- **Materials:**

- Required Textbooks:
 1. Principles of Sustainable Finance (D. Schoenmaker & W. Schramade, 2019).
 2. Carbon Markets: Microstructure, Pricing and Policy (G. Ibikunle & A. Gregoriou, 2018).
- Current industry and academic papers on ESG investing, green bonds, and carbon markets.

- **Readings:**

Selected chapters of the above core texts and current industry and academic papers on ESG investing, green bonds, and carbon markets have already been determined (see page 5). Recommended readings will be downloaded to [NYU Brightspace](#) for your convenience. Required readings may be placed on “course reserves” at [NYU Libraries](#). In addition, weekly lecture notes will be available prior to class to all students 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.

- **Expectations:**

Weekly readings should be reviewed by students prior to class. Students should attend classes and come prepared to engage, participate, and ask questions on concepts they do not fully grasp from the lecture notes. All assignments are due at 11:59pm on the last day of the class week (see the full Course Schedule on page 6). All assignments should be submitted on time to the Teaching Assistant for full credit. It is important that you spend the necessary time working in this course to achieve the expected outcomes by the end of the term. If you face challenges at any time during the semester, please let me know. Please contact me if you expect to miss class. I am available and ready to support your success.

Performance Evaluation

- **Class Presentation:**

Students will be assigned to groups of three or four (depending on the size of the class). I strongly urge that you prepare for every class in study groups, whether or not there is a group assignment. Each group will lead a brief 10 to 15 minutes verbal discussion at the beginning of each class. Dates

will be pre-determined and no written submission necessary. The discussion will comprise a market update on one or more key financial market developments relevant to ESG investments, green bonds, or carbon markets over the prior week.

- **Group Project:**

The group project will consist of a written and in-class presentation on a subject relevant to ESG investments, green bonds, or carbon markets. Details of the project will be shared separately in class and on [NYU Brightspace](#). Students will have to form their own groups and submit a written proposal with the subject and details of their group project no later than the end of week 2. Please, refer and abide by the deadlines below:

Initial proposal submission	5%	due by the end of week 2
Revised proposal submission	5%	due by the end of week 4
Final written presentation	10%	due by the end of week 6
In-class oral presentation	10%	to be held on week 7 & week 8

Each group member must contribute equally to the project. No work for this project may be partially or wholly part of an assignment prepared for another course. In case a student is unable to form a group and/or find a subject on his/her own, he/she will be assigned to a group and/or topic. For the purpose of providing effective feedback, experts evaluations will be resorted to. Although the project will be a collective effort, grades will be allocated individually.

- **Homework Assignments and Class Attendance:**

Weekly homework assignments will be posted on [NYU Brightspace](#). All homework assignments should be submitted electronically by 11:59pm at the end of each class week (see the full Course Schedule on page 6) for full credit to the teaching assistant. Attendance is expected at each class meeting. If you have to miss a class meeting 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](#).

- **Final and Mid-term Exams:**

You will have a 3 hours-window to complete the Final Exam throughout the 72 hours available dates on [NYU Brightspace](#). Once started, you should finish the Final Exam within 3 hours. The Final Exam is open book but should represent your own personal work to be submitted electronically by 11:59pm on the last day of the term. The Mid-term Exam is an open book take-home exam to be completed individually and submitted electronically by 11:59pm at the end of week 5.

- **Grading:**

Homework	35%	weekly
Class Presentation	5%	weekly
Midterm Exam	15%	Friday, February 25
Group Project	30%	week 7 & week 8
Final Exam	15%	Monday, March 21
TOTAL	100%	

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if grade ≥ 93% ⇔ 4.00:A
else if 90% ≤ grade ≤ 92% ⇔ 3.67:A-
else if 87% ≤ grade ≤ 89% ⇔ 3.33:B+
else if 84% ≤ grade ≤ 86% ⇔ 3.00:B
else if 80% ≤ grade ≤ 83% ⇔ 2.67:B-
else if 77% ≤ grade ≤ 79% ⇔ 2.33:C+
else if 70% ≤ grade ≤ 76% ⇔ 2.00:C
else F

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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.

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

Week & Topic	Mandatory Readings	Recommended Readings
Week 1	<u>Principles of Sustainable Finance</u> : 1.3. The role of the financial system; 1.4. Three stages of sustainable finance; 1.5. Challenges to integration of sustainability into finance	•“Report on US Sustainable and Impact Investing Trends 2020”, Forum for Sustainable and Responsible Investment (2020)
ESG Investing		•“Should You Invest in Socially Responsible Funds?”, The Financial Decoder (Podcast), February 6, 2021
Week 2	<u>Principles of Sustainable Finance</u> : 1.2. Sustainability challenges	•“Economic Modeling of Climate Risks”, Theo Le Guenedal (2019)
Climate Risk		
Week 3	<u>Principles of Sustainable Finance</u> : 1.1. Why does sustainability matter?; 9.1. Basics of bonds; 9.2. Why does sustainability matter to bonds?	•“Corporate Green Bonds”, Caroline Flammer (2021)
Sustainable Financing Products 1		
Week 4	<u>Principles of Sustainable Finance</u> : 9.3. Integrating sustainability into bond investing; 9.4. Green bonds and social bonds	•“How ESG Investing Has Impacted the Asset Pricing in the Equity Market”, Bennani et al (2018)
Sustainable Financing Products 2		
Week 5	<u>Carbon Markets: Microstructure, Pricing and Policy</u> : Chapter 2: Emissions Trading in Europe: Background and Policy; Chapter 4: The Price Impact of Block Emissions Permit Trades	•“China Opened a National Carbon Market. Here’s Why it Matters”, Chris Buckley (2021), The NY Times
Carbon Markets 1		
Week 6	<u>Carbon Markets: Microstructure, Pricing and Policy</u> : Chapter 6: Liquidity and Market Efficiency in Carbon Markets	•“Application of Blockchain in Carbon Trading”, Pan et al (2021)
Carbon Markets 2		•“Race to Zero: How Companies Are Deploying Decarbonization Strategies”, Exchanges at Goldman Sachs (Podcast), July 13, 2021
Week 7	<u>Principles of Sustainable Finance</u> : 8.2. Why does sustainability matter to equities?; 8.3. Integrating sustainability into equity investing	•“ESG ETFs and the COVID-19 Stock Market Crash of 2020: Did Clean Funds Fare Better?”, Pavlova and Boyrie (2021)
Impact Investing 1		•“The Green Bond Market in Hong Kong: Developing a Robust Ecosystem for Sustainable Growth”, HK Academy of Finance (2020)
Week 8	<u>Principles of Sustainable Finance</u> : 8.4. Impact investing	•“Harnessing Blockchain for Sustainable Development: Prospects and Challenges”, Hanna Halaburda (2021)
Impact Investing 2		•“Sustainable ESG Investing: Turning Promises into Performance”, Exchanges at Goldman Sachs (Podcast), July 14, 2020

Course Schedule

SESSIONS & TOPICS	LECTURES	ASSIGNMENTS
<p>Week 1 (Mon, Jan 24 – Sun, Jan 30)</p> <p>ESG Investing</p>	<p><i>Introduction to sustainable finance</i> <i>ESG scoring</i> <i>Performance in the stock market</i> <i>Performance in the corporate bond market</i></p> <p>Fri, Jan 28 (2PM – 4:41PM)</p>	<p>Readings for week 1 Class syllabus Class announcements in NYU Brightspace</p>
<p>Week 2 (Mon, Jan 31 – Sun, Feb 6)</p> <p>Climate Risk</p>	<p><i>Introduction to climate risk</i> <i>Climate risk modeling</i> <i>Regulation of climate risk</i> <i>Portfolio management with climate risk</i></p> <p>Fri, Feb 4 (2PM – 4:41PM)</p>	<p>Readings for week 2 Group in-class presentation Homework 1 due Group project proposal due</p>
<p>Week 3 (Mon, Feb 7 – Sun, Feb 13)</p> <p>Sustainable Financing Products 1</p>	<p><i>SRI Investment funds</i> <i>Green bonds</i></p> <p>Fri, Feb 11 (2PM – 4:41PM)</p>	<p>Readings for week 3 Group in-class presentation Guest speaker Homework 2 due</p>
<p>Week 4 (Mon, Feb 14 – Sun, Feb 20)</p> <p>Sustainable Financing Products 2</p>	<p><i>Social bonds</i> <i>Other sustainability-linked strategies</i></p> <p>Fri, Feb 18 (2PM – 4:41PM)</p>	<p>Readings for week 4 Group in-class presentation Homework 3 due Group project proposal (revised) due</p>
<p>Week 5 (Mon, Feb 21 – Sun, Feb 27)</p> <p>Carbon Markets 1</p>	<p><i>Economics of carbon markets</i> <i>Introduction to carbon trading</i> <i>Understanding carbon price drivers</i></p> <p>Fri, Feb 25 (2PM – 4:41PM)</p>	<p>Readings for week 5 Group in-class presentation Guest speaker Mid-term Exam due (Fri, Feb 25)</p>
<p>Week 6 (Mon, Feb 28 – Sun, Mar 6)</p> <p>Carbon Markets 2</p>	<p><i>Carbon leakage, illiquidity, and volatility</i> <i>ETS (hedging, banking, borrowing)</i> <i>New market mechanisms</i></p> <p>Fri, Mar 4 (2PM – 4:41PM)</p>	<p>Readings for week 6 Group in-class presentation Homework 4 due Group project (final writing) due</p>
<p>Week 7 (Mon, Mar 7 – Sun, Mar 13)</p> <p>Impact Investing 1</p>	<p><i>Definition (Impact Investing)</i> <i>Sustainable development goals (SDG)</i></p> <p>Fri, Mar 11 (2PM – 4:41PM)</p>	<p>Readings for week 7 Group project in-class oral presentation Homework 5 due</p>
<p>Week 8 (Mon, Mar 14 – Mon, Mar 21)</p> <p>Impact Investing 2</p>	<p><i>Voting policy, shareholder activism</i> <i>The challenge of reporting</i> <i>Final Exam Review</i></p> <p>Fri, Mar 18 (2PM – 4:41PM)</p>	<p>Readings for week 8 Group project in-class oral presentation Final Exam due (Mon, Mar 21)</p>