Instructor Information

- Instructor: Stephen R. Freedman
- Email: sf147@nyu.edu
- Office Address: n.a.
- Office Hours: by appointment.

Course Information

- Class Meeting Times: 3rd, 4th, 6th and 7th January 2023, 9:00am-12pm ET.
- Class Location: conducted via Zoom, details to be provided during week before first class

Course Prerequisites

- CORE-GP 1021 and CORE-GP 1022
Or
- URPL-GP 2660
- PADM-GP 2311 recommended

Course Description

How can financial capital be deployed to help solve the most pressing environmental problems of our time? This course will provide students a thorough understanding of how key environmental challenges can be addressed through innovative financing techniques and investment strategies. Students will be introduced to key thematic areas of environmental finance such as water, energy, waste management and sustainable agriculture. They will learn about financial instruments, structures, investment approaches and asset classes that can be relied upon to achieve positive environmental outcomes and impact including, but not limited to,
private market investments, green bonds, pay-for-success agreements, shareholder engagement, trading in environmental certificates, and conservation finance.

Course and Learning Objectives

By the end of the course, students should be able to

1. recognize key environmental challenges and the potential for investment capital to help address them
2. understand the main instruments of environmental finance across asset classes with their strengths and limitations
3. understand the specificities of environmental finance in the main thematic areas of water, food, energy/climate change and waste.
4. identify and evaluate specific investment opportunities by applying concepts of environmental finance

Learning Assessment Table

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<thead>
<tr>
<th>Graded Assignment</th>
<th>Course Objective Covered</th>
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<tr>
<td>Participation (live)</td>
<td>All</td>
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<tr>
<td>Assignment 1</td>
<td>#2, #3</td>
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<tr>
<td>Final Exam</td>
<td>#2, #3, #4</td>
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Reading Materials

There is no assigned textbook for this course. Reading material is based on publicly available reports and articles.

For students who would like to brush up on introductory finance and investments, the following resources may be consulted:


Great online investment resource: [www.investopedia.com](http://www.investopedia.com)

Useful education site at the SEC: [https://www.investor.gov/introduction-investing](https://www.investor.gov/introduction-investing)

Academic Integrity

Academic integrity is a vital component of Wagner and NYU. All students enrolled in this class are required to read and abide by [Wagner's Academic Code](http://Wagner's Academic Code). All Wagner students have already
read and signed the Wagner Academic Oath. Plagiarism of any form will not be tolerated and students in this class are expected to report violations to me. If any student in this class is unsure about what is expected of you and how to abide by the academic code, you should consult with me.

Henry and Lucy Moses Center for Students with Disabilities at NYU

Academic accommodations are available for students with disabilities. Please visit the Moses Center for Students with Disabilities (CSD) website and click on the Reasonable Accommodations and How to Register tab or call or email CSD at (212-998-4980 or mosescsd@nyu.edu) for information. Students who are requesting academic accommodations are strongly advised to reach out to the Moses Center as early as possible in the semester for assistance.

Class Policies

This course will abide by the Wagner School’s general policy guidelines on incomplete grades, academic honesty, and plagiarism. It is the student’s responsibility to become familiar with these policies. All students are expected to pursue and meet the highest standards of academic excellence and integrity. Please familiarize yourself with the following guidelines:

Incomplete policy, Course withdrawal policy, Grading policy

Assignments and Evaluation

Class Participation (including case study): 30% of total grade

Participation is awarded based on: attendance, punctuality and engagement in class discussions. Giving the concentrated format of the course over four days, missing at most one day is possible under extraordinary circumstances. In such a case, please reach out to me and a written assignment will be provided to you instead of online presence, with the assignment designed to take approximately the same time as the class to complete. The assignment will be reflected in class participation. Extraordinary circumstances include religious observances and illness but you must give notice via email as soon as possible. All students benefit from high levels of participation, so you are expected to do readings prior to class, attend class, and contribute to the discussion. Attendance is taken via Zoom. I will be making note of those who routinely participate in the discussion. Active participation during the case study on day 3 will receive particular weight.

Written Assignment (due on day 3, 6 January 2023): 25% of total grade

Final Take-Home Exam (due on 17 January 2023): 45% of total grade
NYU Classes

All announcements, resources, and assignments will be delivered through the NYU Classes site. I may modify assignments, due dates, and other aspects of the course as we go through the term with advance notice provided as soon as possible through the course website.

Overview of Semester

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<tr>
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<th>Date</th>
<th>Topic</th>
<th>Deliverable</th>
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<tr>
<td>Day 1, first half</td>
<td>3 January</td>
<td>Introduction: key environmental challenges and concepts</td>
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<td>Day 1, second half</td>
<td>3 January</td>
<td>Investment instruments available to finance environmental goals</td>
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<td>Day 2, second half</td>
<td>4 January</td>
<td>Sustainable agriculture</td>
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<td>Day 3, first half</td>
<td>6 January</td>
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<td>Day 3, second half</td>
<td>6 January</td>
<td>Case study on renewable energy</td>
<td>Case study</td>
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<td>Water</td>
<td>Written assignment</td>
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<td>Miscellaneous concluding topics</td>
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<td>17 January</td>
<td>Final take-home exam due</td>
<td>Written assignment</td>
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Detailed Course Overview

Day 1, first half: Introduction

- Scale of environmental challenges (global footprint network, planetary boundaries)
- The Environment within the UN’s Sustainable Development Goals
- Critical need for private capital given scope of funding gap
- Interdependencies abound: The water – energy – food nexus
- Overview of course
Reading Materials

Overview of Environmental Challenges:

Ecosystem Services:
- What are Ecosystem Services? EarthwiseAware.

Business case Environmental Sustainability:

The role of private capital:

Acknowledging interdependencies:

Optional reading:

Day 1, second half: Investment instruments available to finance environmental goals
- Overview of asset classes and instruments
- Listed market instruments
- Private markets investments (Equity, debt, real assets)
- Thematic equity investments
- Shareholder engagement
- Green bonds
- Pay-for-success contracts
- Other innovative social finance instruments
- Conservation finance
Reading Materials

Overview of Investment Instruments:

Thematic equity investments:
- Pictet Asset Management (2018), Global Environmental Opportunities: Transforming Sustainable Investment, Geneva

Green bonds:

Environmental impact bonds:

Shareholder engagement (examples):
- Trillium Asset Management shareholder proposal for Whole Foods Market.

Optional reading:

Day 2, first half: Waste management and the circular economy
- Limits of linear economy
- Introducing the circular economy
- Rethinking business and production processes
- Merging of impact investing and ESG
Reading Materials

Waste Management:

Circular Economy:

Optional reading:

Day 2, second half: Sustainable agriculture
- Challenge of feeding 9 billion people
- Limits arising from food - water - energy nexus
- Harnessing natural processes: holistic approaches
- Role of technology
- Sustainable agriculture as climate change adaptation

Reading Materials

Agricultural sector:

Investing in agriculture:

Optional reading
• Murray, L. and McGrath, M. (2016), "Sustainable Farmland Investment Strategies: An Introduction to Current Conditions", Yale School of Management & Yale School of Forestry and Environmental Studies, November.

Day 3, first half: Climate change investing
• Mitigation vs adaptation
• Pathways to 2 degrees warming scenario: all hands on deck
• Renewable energy
• Energy efficiency
• Going carbon negative? Carbon capture and storage

Reading Materials

Overview of investment options for climate change investing:
• Boston College Center for Corporate Citizenship (2009), "Handbook on Climate-Related Investing across Asset Classes", Boston College Carroll School of Management, Institute for Responsible Investment.

Investing in Mitigation:
• J Wilcox et al. (2021), "Carbon Dioxide Removal Primer". Online primer

Investing in Adaptation:

Carbon pricing:

Optional reading
• Haszeldine et al. (2018), “Negative emissions technologies and carbon capture and storage to achieve the Paris Agreement commitments”, Philosophical Transactions, Royal Society, Volume 376, Issue 2119.

Day 3, second half: Case study renewable energy

• Renewable energy case study
• Limits of linear economy
• Introducing the circular economy
• Rethinking business and production processes
• Merging of impact investing and ESG

Reading Materials

Case study


Day 4, first half: Water

• Challenge of water scarcity
• Water cycle and water value chain
• Types of investment (infrastructure: green vs grey, treatment, contamination prevention, demand management etc.)
• Water investments as climate change adaptation
• Water rights and water markets

Reading Materials

Water Investing:

• Impax Asset Management (2013), “Investing in Water: Global Opportunities in a Growth Sector”.
• The Kresge Foundation et al. (2017), “Climate Resilience & Equitable Water Systems Capital Scan”, June

Water rights:

• Lustgarten, A. (2016), "Liquid Assets: A maverick hedge fund manager thinks Wall Street is the answer to the water crisis in the West", Propublica, co-published with The Atlantic, February 9

Optional reading:
• EY (2013), "The US water sector on the verge of transformation", Global Cleantech Center white paper.

Day 4, second half: Miscellaneous concluding topics
• Environmental Finance and developing countries: triple bottom line opportunities
• Outlook

Reading Materials

Conservation Finance:
• Credit Suisse (2016), "Conservation Finance, From Niche to Mainstream: The Building of an Institutional Asset Class".

Environmental Finance in Developing Countries:
• UNEP (2016), “Green Finance for Developing Countries: Needs, Concerns and Innovations”, July
• UNDP (2012), "International Guidebook of Environmental Finance Tools. A Sectoral Approach: Protected Areas, Sustainable Forests, Sustainable Agriculture and Poor Energy", Executive Summary

NYU’s Calendar Policy on Religious Holidays

NYU’s Calendar Policy on Religious Holidays states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.