

FRE 9743 – Special Topics in Risk Management: Climate Change Risk

Instructor Information

- [Naresh Malhotra, PhD](#), Director/Supervisor, SocGen, and Adjunct Professor (NYU)
- [Marcus Cree, FRM, SCR](#), MD, Greenpoint Capital, and Adjunct Professor (NYU)
- Phone: +1.917.886.5892
- Naresh.Malhotra@NYU.edu

Course Information

- **Syllabus date** – Mar 22, 2022
- **Course number** – FRE 9743
- **Credits** – 3 credits
- **Course name** – Climate Change Risk
- **Course description** –

This class designed to introduce FRE graduate students to the newest and high impact discipline in risk management today, the climate change risk. The course is meant to introduce the development and latest thinking in climate risk and its impact on financial institutions, this course will provide students with the foundation they need to develop careers spanning cutting-edge finance and the fight for a sustainable future.

- **Prerequisites** – None
- **Classroom number and building** – In-person (Fall 2022)
- **Virtual (online) meeting days and times** – By appointment on Mondays

Course Overview and Goals

The current class provides the basic components of climate risk, risk assessments, and risk drivers. On completion of this class, students will be able to:

- Understand the core elements of climate risk and associated management,
- Be able to apply climate risk techniques to pricing and risk assessment,
- Comprehend the basics behind climate risk methodologies,
- Climate scenario analysis, and
- Develop keen appreciation for regulatory expectations and prevailing industry practices.

Course Requirements

The grading for this class will be based on homework (assigned readings), open-book quizzes, open book final, class participation, and individual project.

Grading of Assignments

The grade for this course will be determined according to the following formula:

| Assignments/Activities | % of Final Grade |
|---------------------------------------|-------------------------|
| 10 Homework assignments | 35% |
| 10 quizzes | 35% |
| Class project/ Class participation | 20% |
| Final test | 10% |

Letter Grades

Letter grades for the entire course will be assigned as follows:

| Letter Grade | Points | Percent |
|--------------|--------|------------------|
| A | 4.00 | 92.5% and higher |
| A- | 3.67 | 90.0 – 92.49% |
| B+ | 3.33 | 87.5% - 89.99% |
| B | 3.00 | 82.5% - 87.49% |
| B- | 2.67 | 80% - 82.49% |
| C+ | 2.33 | 77.5% - 79.99% |
| C | 2.00 | 70.0% - 77.49% |
| F | .00 | 69.99% and lower |

View Grades

The grades will be available in Albert with 3 days after the final class.

Course Schedule

Topics and Assignments

| Week/Date | Topic | Reading |
|-----------|---|--|
| Week 1 | Introduction to Climate risk <ul style="list-style-type: none"> • Historical examples • Key motivations • Impact on financial institutions | Class presentation deck, and contemporary industry insights and papers |
| Week 2 | Climate risk drivers – Part I <ul style="list-style-type: none"> • The evolution of climate-related risks • Physical risk drivers | Class presentation deck, and contemporary industry insights/papers |
| Week 3 | Climate risk drivers – Part 2 <ul style="list-style-type: none"> • Transition risk drivers • Uncertainties related to climate risk drivers | Class presentation deck, and contemporary industry insights/papers |
| Week 4 | From Toronto To Glasgow – A historical perspective on evolution of approach(es) to address Climate Change Risk | Class presentation deck, and contemporary industry insights/papers |
| Week 5 | Regulatory Policies and Players for a greener future <ul style="list-style-type: none"> • IPCC - Intergovernmental Panel on Climate Change • TCFD – Taskforce on Climate related Financial Disclosures • NGFS – Network of central banks for the Greening of the Financial System • IAMs – Integrated Assessment Models • e) SDG – UN Sustainable Development Goals | Class presentation deck, and contemporary industry insights/papers |

| | | |
|---------|---|--|
| Week 6 | Climate risk methodologies – Part I <ul style="list-style-type: none"> • Conceptual considerations in climate-related financial risk measurement • Data requirements • Characteristics of climate-risk classification • Characteristics of scenario analysis and stress-testing methodologies. | Class presentation deck, and contemporary industry insights/papers |
| Week 7 | Climate risk methodologies – Part II <ul style="list-style-type: none"> • Exposure mapping – Challenge of climate risks • Forward-looking assessment methodologies and complexity of climate-related risk modelling. | Class presentation deck, and contemporary industry insights/papers |
| Week 8 | Climate Change in Finance 1 – Green Bonds <ul style="list-style-type: none"> • Role of Bonds in Climate Change • Green vs. Social Bonds • Green Bond Taxonomy • Green Bond Principles | Class presentation deck, and contemporary industry insights/papers |
| Week 9 | Climate Change in Finance 2– Credit Risk Impacts <ul style="list-style-type: none"> • Transition Risk • Physical Risk • Climate Adjusted Risk Weighted Assets | Class presentation deck, and contemporary industry insights/papers |
| Week 10 | Climate Change in Finance 3 – <ul style="list-style-type: none"> • Portfolio testing using climate scenarios • Developing and customizing scenarios • Climate Scenarios in Action | Class presentation deck, and contemporary industry insights/papers |

| | | |
|---------|---|--|
| Week 11 | Practical Implications of Climate change on financial institutions strategy <ul style="list-style-type: none"> • Banking • Insurance • Asset Management | Class presentation deck, and contemporary industry insights/papers |
| Week 12 | Future of Climate Change Finance <ul style="list-style-type: none"> • Carbon tax vs. trading • Carbon capture and credits • Trading and hedging | Class presentation deck, and contemporary industry insights/papers |
| Week 13 | Study group project discussions | Student's presentation decks, and project reports |
| Week 14 | Current and future trends in Climate risk and associated management <ul style="list-style-type: none"> • Final test • Class presentations | Class presentations by students |

Course Materials

Required Textbooks & Materials

- Multiple contemporary industry and academic papers on model risk management topics as applied to *risk models, valuation models, algorithmic/ML/AI models, and estimation approaches*.
- Reference book: [A Short Guide to Climate Change Risk](#)
- There are several good books that are in the works at this time, we will provide a definitive list in the first-class in Fall-2021.

Resources

- **Access your course materials:** [NYU Classes](#) (nyu.edu/its/classes)
- **Databases, journal articles, and more:** [Bern Dibner Library](#) (library.nyu.edu) [NYU Virtual Business Library](#) (guides.nyu.edu/vbl)
- **Obtain 24/7 technology assistance:**
Tandon IT Help Desk (soehelpdesk@nyu.edu, 646.997.3123)
NYU IT Service Desk (AskIT@nyu.edu, 212-998-3333)

Policies

Academic Misconduct

- A. Introduction: 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.
- 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 done individually.
 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 have 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.

Disability Disclosure Statement

Academic accommodations are available for students with disabilities. Please contact the **Moses Center for Students with Disabilities** (212-998-4980 or mosescsd@nyu.edu) for

further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

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.