

Master of Science in Sustainability Management
Financing the Clean Energy Economy (SUMA PS 5197)
Spring 2022, Mondays 6:10-8:00pm
3 credits

Instructor: Curtis Probst, CFA csp2138@columbia.edu (cell, if urgent: 646 645 6595)
Office Hours: By appointment (email to schedule), preferably before or after class
Response Policy: Email is my preferred mode of communication (normal response the same or next business day)

Course Overview

We need to transition toward a more environmentally-sustainable society given both pollution and its health effects, and the impacts of extreme weather and climate change. The production and consumption of energy is the largest contributor to these concerns, and so the transition to a clean energy economy is essential. The increasing energy needs of the world's growing population make this an ongoing challenge. At the same time, energy security and affordability, and social and economic inequities, must also be considered. New technologies and effective policies are needed to help drive increased deployment of renewable energy and energy efficiency. Finance is also a key lever to drive the implementation of clean energy. The availability and cost of capital is a key determinant in scaling renewable energy and energy efficiency technologies.

This course focuses on the finance and market aspects of the clean energy economy, and integrates technology, policy, and finance to evaluate both the opportunities and challenges. There is a focus on renewable energy generation, as mass electrification using cleaner generation sources is necessary to sustain our energy-dependent lives and economies. The course also looks at energy efficiency, including specific end-uses of energy that are responsible for the majority of emissions (e.g., personal vehicles, buildings). Throughout the course, finance will be analyzed as a barrier to, or enabler of, greater adoption of clean energy.

This is a full semester course. Interactive lectures, and guest speakers where appropriate, will cover these topics in the first twelve classes (the final two remaining classes will be reserved for group presentations). The course can be divided into three sections (class numbers shown in parentheses):

- Acquiring a basic understanding of the U.S. electricity market: (1) history of the energy industry and the importance of finance, (2) energy fundamentals and electricity markets today, and (3) clean energy and grid integration.
- Applying the tools of finance to clean energy: (4) overview of key financing concepts, (5) financial modeling for energy projects, (6) review of key financing concepts.
- Integrating knowledge of the electricity market and finance to explore: (7) opportunities and challenges of clean energy, (8) rate design and the financing of distributed energy resources, (9) financing mechanisms for clean energy, (10) electric vehicles and the grid, (11) building energy efficiency, and (12) equity, environment, and economics.

Course assignments will include financial models, problem sets, case studies, and a final group presentation. The financial modeling will be designed to consider the varying levels of student experience. An important aspect of the course is for students to learn some of the analytical tools used by industry practitioners to make investment decisions. While no specific financial modeling experience is required, students should have basic spreadsheet skills or be prepared to learn them. As the course progresses, students will learn to appreciate the roles of technology, policy, and finance in the transition to a clean energy economy. Upon completion of this class, students should understand the fundamentals of the U.S. electricity sector, the role of clean energy, the opportunities and limitations of finance, and some of the different mechanisms to support clean energy finance.

This is an elective course designed for both students with a limited background in finance but with an interest in building that skill set, and students with prior backgrounds in finance that are seeking to apply those skills to financing the clean energy economy. Space permitting, the course is open to cross-registrants from other Columbia University graduate programs, and students from several schools at Columbia have successfully completed this course (Arts and Sciences, Business, Engineering and Applied Science, International and Public Affairs, Professional Studies, Public Health, and Social Work). The course is approved for the Certificate in Sustainable Finance requirement.

While this course has been taught in online and HyFlex (hybrid flexible) formats, the current expectation is that this course will be taught in-person this semester.

Learning Objectives

By the end of this course students should be able to:

- L1. Describe how the existing electricity markets function in the U.S., and how clean energy technologies are developing within, and apart from, these markets
- L2. Assess the implications of larger adoption of clean energy technologies to the broader electric grid
- L3. Summarize some of the existing business models and financial techniques for bringing clean energy to markets
- L4. Create basic financial models for evaluating clean energy opportunities and demonstrate good technique in the development of these models
- L5. Discuss some of the key opportunities and challenges faced in transitioning to clean energy
- L6. Identify mechanisms that can be used to support the development and deployment of clean energy

Considering the breadth of the energy and financial markets, and the rapidly evolving nature of each, the goal is not to learn about every means of financing clean energy. The course's objective is to provide students a new level of comfort in discussing the role of finance in the transition to a clean energy economy. Students will focus on several examples of that transition through the class materials, and may choose a specific area in which they have personal interest for the group presentation.

Readings

Required

American Clean Power. "Wind Power Facts." *cleanpower.org*. Web. 17 Dec 2021.
<https://cleanpower.org/facts/wind-power/> (N.pag)

Clean Energy States Alliance. "A Homeowner's Guide to Solar Finance: Leases, Loans, and PPAs." *cesa.org*, Nov 2018: pp. 2-17. Web. 17 Dec 2021. <http://www.cesa.org/assets/2015-Files/Homeowners-Guide-to-Solar-Financing.pdf> (16 pages)

Environment America. "The True Value of Solar." *environmentamerica.org*, Jul 2019: pp. 1-12. Web. 17 Dec 2021.
<https://environmentamerica.org/sites/environment/files/resources/AME%20Rooftop%20Solar%20Jul19%20web.pdf> (12 pages)

Federal Energy Regulatory Commission. "Energy Primer: A Handbook of Energy Market Basics." *ferc.gov*, Nov 2015: pp. 1-4, 35-56. Web. 17 Dec 2021. <https://www.ferc.gov/market-assessments/guide/energy-primer.pdf> (26 pages)

Fitzgerald, Garrett, Chris Nelder and James Newcomb. "Electric Vehicles as Distributed Energy Resources." *rmi.org*. Rocky Mountain Institute, 2016: pp. 6-9. Web. 17 Dec 2021. http://www.rmi.org/pdf_evs_as_DERs (4 pages)

Fitzgerald, Garrett et al. “The Economics of Battery Energy Storage: How multi-use, customer-sited batteries deliver the most services and value to customers and the grid. Executive Summary.” *rmi.org*. Rocky Mountain Institute, Oct 2015. Web. 17 Dec 2021. https://rmi.org/wp-content/uploads/2017/05/RMI_Document_Repository_Public-Reports_RMI-TheEconomicsOfBatteryEnergyStorage-ExecutiveSummary.pdf (8 pages)

Lazar, Jim. “Teaching the ‘Duck’ to Fly, Second Edition.” *raponline.org*. The Regulatory Assistance Project, Feb 2016: pp. 5-9. Web. 17 Dec 2021. <http://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-teachingtheduck2-2016-feb-2.pdf> (5 pages)

Lazard. “Lazard’s Levelized Cost of Energy Analysis-Version 15.0.” *lazard.com*, Oct 2021. Web. 17 Dec 2021. <https://www.lazard.com/media/451905/lazards-levelized-cost-of-energy-version-150-vf.pdf> (21 pages)

National Renewable Energy Laboratory. “Federal Tax Incentives for Energy Storage Systems.” *nrel.gov*, Jan 2018. Web. 17 Dec 2021. <https://www.nrel.gov/docs/fy18osti/70384.pdf> (1 page)

National Renewable Energy Laboratory. “Ten Years of Analyzing the Duck Chart.” *nrel.gov*, 26 Feb 2018. Web. 17 Dec 2021. <https://www.nrel.gov/news/program/2018/10-years-duck-curve.html> (3 pages)

NC Clean Energy Technology Center. “Commercial Guide to the Federal Investment Tax Credit for Solar PV.” *dsireusa.org*, Dec 2015. Web. 17 Dec 2021. http://www.dsireusa.org/resources/presentations-and-publications/commercialite_factsheet_final-dec2015update/ (6 pages)

Norton Rose Fulbright. “Corporate Renewable PPAs – a framework for the future?” *nortonrosefulbright.com*, May 2017. Web. 17 Dec 2021. <http://www.nortonrosefulbright.com/knowledge/publications/149117/corporate-renewable-ppas-a-framework-for-the-future> (5 pages)

Solar Energy Industries Association. “Solar Industry Research Data.” *seia.org*, 2019. Web. 17 Dec 2021. <https://www.seia.org/solar-industry-research-data> (N.pag)

U.S. Department of Energy. “Solar-Plus-Storage 101.” *energy.gov*, 11 Mar 2019. Web. 17 Dec 2021. <https://www.energy.gov/cere/solar/articles/solar-plus-storage-101> (8 pages)

U.S. Energy Information Administration. “Electricity explained: Electricity in the United States.” *eia.gov*, 18 Mar 2021. Web. 17 Dec 2021. <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php> (4 pages)

U.S. Energy Information Administration. “Electricity explained: Electricity generation, capacity, and sales in the United States.” *eia.gov*, 18 Mar 2021. Web. 17 Dec 2021. <https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php> (8 pages)

U.S. Energy Information Administration. “Use of energy explained: Energy use for transportation (basic).” *eia.gov*, 17 May 2021. Web. 17 Dec 2021. <https://www.eia.gov/energyexplained/use-of-energy/transportation.php> (3 pages)

U.S. Energy Information Administration. “Use of energy explained: Energy use for transportation (in depth).” *eia.gov*, 21 May 2021. Web. 17 Dec 2021. <https://www.eia.gov/energyexplained/use-of-energy/transportation-in-depth.php> (3 pages)

Wilson Sonsini Goodrich & Rosati. “Innovations and Opportunities in Energy Efficiency Finance.” *wsg.com*, May 2014. Web. 17 Dec 2021. <https://www.wsg.com/publications/PDFSearch/WSGR-EE-Finance-White-Paper-14.pdf> (32 pages)

Wilson Sonsini Goodrich & Rosati. “Project Finance Primer for Renewable Energy and Clean Tech Projects.” *wsg.com*, Sep 2014. Web. 17 Dec 2021. <https://www.wsg.com/publications/PDFSearch/renewable-energy-primer-0914.pdf> (20 pages)

Optional

Fernando, Jason. "Internal Rate of Return (IRR)." *investopedia.com*. Investopedia, 7 Apr 2021. Web. 17 Dec 2021. <https://www.investopedia.com/terms/i/irr.asp> (N.pag)

Fernando, Jason. "Net Present Value (NPV)." *investopedia.com*. Investopedia, 29 Aug 2021. Web. 17 Dec 2021. <https://www.investopedia.com/terms/n/npv.asp> (N.pag)

Hargrave, Marshall. "Weighted Average Cost of Capital (WACC)." *investopedia.com*. Investopedia, 2 Nov 2021. Web. 17 Dec 2021. <https://www.investopedia.com/terms/w/wacc.asp> (N.pag)

Heyford, Shauna Carther. "Understanding the Time Value of Money." *investopedia.com*. Investopedia, 29 Oct 2021. Web. 17 Dec 2021. <https://www.investopedia.com/articles/03/082703.asp> (N.pag)

Lazard. "Lazard's Levelized Cost of Hydrogen Analysis-Version 2.0." *lazard.com*, Oct 2021. Web. 17 Dec 2021. <https://www.lazard.com/media/451895/lazards-levelized-cost-of-hydrogen-analysis-version-20-vf.pdf> (16 pages)

Lazard. "Lazard's Levelized Cost of Storage Analysis-Version 7.0." *lazard.com*, Oct 2021. Web. 17 Dec 2021. <https://www.lazard.com/media/451882/lazards-levelized-cost-of-storage-version-70-vf.pdf> (35 pages)

NARUC. "Distributed Energy Resources Rate Design and Compensation." *naruc.org*. National Association of Regulatory Utility Commissioners, Nov 2016. Web. 17 Dec 2021. <https://www.naruc.org/rate-design/> (181 pages)

Assignments and Assessments

The expected assignments, their contribution to your final grade, and the learning objectives to which they relate are described below. Each assignment may be modified based on the progress of the class over the semester.

I. Statement of purpose (5% of grade)

Students will prepare a one-page (double-spaced) statement of purpose that (a) discusses what you are looking to get out of the class, (b) highlights any particular skills you can contribute to the class or to your group, and (c) identifies one or more clean energy technologies, currently being deployed, in which you have a particular interest (this may help you identify a topic for the group presentation and fellow group members). Please include your (a) name and (b) UNI. Please format the document neatly, and ensure that it may be printed onto one page without changing printer settings.

II. Storyboard (5% of grade)

Part 1 (worth 3% of grade): Create a Storyboard that, in three panels, tells the story of why you are interested in finance, clean energy, and/or the environment. Use the free software: <https://www.storyboardthat.com/storyboard-creator> (links to an external site). Post to the discussion board on Canvas. Your storyboard can reflect your upbringing, academic background, professional experience, or other relevant information. The purpose of this assignment is for everyone to get to know everyone better (which will be helpful in discussions and in group work).

Part 2 (worth 2% of grade): Reflect on the Storyboards of your classmates, and post to the discussion board on Canvas, (a) what themes do you see? (b) what things do you appear to have in common? (200 words or less)

III. Five assignments during the semester (60% of grade)

Assignment 1 (8%) (L4): Students will build a simple Excel financial model based upon a series of instructions. ****Please pay attention to the financial modeling "best practices" discussed in class****. The model will focus on basic Excel concepts and good modeling techniques, and introduce certain financial concepts discussed in greater detail later in the course. Please ensure that the model is legible, labeled appropriately, and formatted neatly. Please also ensure that it may be printed out neatly without changing printer settings.

Assignment 2 (13%) (L4): Students will create another financial model(s), this time used to calculate the levelized cost of energy for a specific technology(ies). This model will take the basic financial concepts and good modeling techniques practiced in Assignment 1, and apply them to specific clean energy applications.

Assignment 3 (13%) (L4): Students will create a financial model for a clean energy project. The model will focus on more complex model design, and will also build on the skills practiced in Assignments 1 and 2.

Assignment 4 (13%) (L1, L2, L5, L6): Students will answer a set of quantitative and qualitative short answer questions. These questions will discuss the basic elements of the U.S. electricity markets, clean energy technologies, integration of clean energy into the grid, and financial techniques for bringing clean energy to market.

Assignment 5 (13%) (L3, L4): Students will review one case study on financing the transition to clean energy. Students will answer a series of questions based on their knowledge of the markets and/or financial analyses that they will perform.

IV. Group Presentation (25%) (L1, L2, L3, L5, L6)

Students will work in groups to present the key aspects of a particular clean energy technology or project. The deliverable will be the in-class presentation, plus the associated PowerPoint slides. The targeted group size and length of presentation will depend, in part, upon final enrollment in the class, but would likely be groups of 4-6 students and presentations 15-20 minutes in length. The final grade will be based (a) 20% upon instructor/teaching assistant evaluation of the assignment, and (b) 5% upon peer evaluations provided by fellow group members who will evaluate your relative contribution.

V. Class Participation (5%)

Attendance alone does not count toward your participation grade. Contributing to the class means enhancing the quality of the class experience for yourself and others, whether in discussions, group work, or otherwise. It involves making relevant, useful and non-obvious comments, or posing pertinent questions, in clear and succinct language.

Grading

The final grade will be calculated as described below:

FINAL GRADING SCALE

Grade	Percentage
A+	98–100 %
A	93–97.9 %
A-	90–92.9 %
B+	87–89.9 %
B	83–86.9 %
B-	80–82.9 %
C+	77–79.9 %
C	73–76.9 %
C-	70–72.9 %
D	60–69.9 %
F	59.9% and below

Assignment/Assessment	% Weight	Individual or Group / Team Grade
Statement of Purpose	5%	Individual
Storyboard	5%	Individual
Assignment #1	8%	Individual
Assignment #2	13%	Individual
Assignment #3	13%	Individual
Assignment #4	13%	Individual
Assignment #5	13%	Individual
Group Presentation: Presentation and Submission	20%	Group
Group Presentation: Peer Evaluation of Individual Contribution	5%	Individual
Class Participation	5%	Individual

Course Schedule/Course Calendar

Session, Date	Topics and Activities	Readings (due this day); required unless otherwise indicated	Assignments (due on this date)
One 1/24	<p>History of the Energy Industry and the Importance of Finance (L1)</p> <p>Topics: *Introductions *Goals/ Context *Course Key Themes/ Goals *Class Deliverables *Brief History of Energy Industry *Importance of Finance</p> <p>Activities: *Course Overview *Lecture *Discussion</p>	n/a	--
Two 1/31	<p>Energy Fundamentals and Electricity Markets Today (L1, L2)</p> <p>Topics: *Forms of Electricity Production *Basic Terminology *Production Efficiency *LCOE *Variable Costs *Fixed Costs *Electricity Prices</p> <p>Activities: *Class Introductions</p>	<p>Federal Energy Regulatory Commission. "Energy Primer: A Handbook of Energy Market Basics." pp. 1-4, 35-56. (26 pages)</p> <p>U.S. Energy Information Administration. "Electricity explained: Electricity in the United States." (4 pages)</p> <p>U.S. Energy Information Administration. "Electricity explained: Electricity generation, capacity, and sales in the United States." (8 pages)</p>	--

	<ul style="list-style-type: none"> *Recap of Prior Lecture *Lecture *Discussion 		
Three 2/7	<p>Clean Energy and Grid Integration (L1, L2)</p> <p>Topics:</p> <ul style="list-style-type: none"> *Grid context of clean energy technologies *Major energy “products” *Role of renewable generation *Net metering and load-based resources *Role of storage and EVs in grid integration <p>Activities:</p> <ul style="list-style-type: none"> *Recap of Prior Lecture *Think-Pair-Share *Lecture *Discussion *Class Exercise 	<p>American Clean Power. “Wind Power Facts.” (N.pag)</p> <p>Fitzgerald, Garrett et al. “The Economics of Battery Energy Storage: How multi-use, customer-sited batteries deliver the most services and value to customers and the grid. Executive Summary.” (8 pages)</p> <p>National Renewable Energy Laboratory. “Ten Years of Analyzing the Duck Chart.” (3 pages)</p> <p>Solar Energy Industries Association. “Solar Industry Research Data.” (N.pag)</p> <p>U.S. Department of Energy. “Solar-Plus-Storage 101.” (8 pages)</p>	<p>Statement of purpose</p> <p>Storyboard (Part 1)</p>
Four 2/14	<p>Overview of Key Financing Concepts (L3)</p> <p>Topics:</p> <ul style="list-style-type: none"> *Basic financial concepts *Capital structure (debt vs. equity) *Importance of market conditions *Different types of financing *Tax aspects of financing *Project finance *Basics of financial modeling <p>Activities:</p> <ul style="list-style-type: none"> *Recap of Prior Lecture *Lecture *Discussion *Model-Building Demonstration 	<p><i>For the Lazard report, please review key charts and assumptions to get an understanding of LCOE. It is not necessary to read each page in detail.</i></p> <p>Lazard. “Lazard’s Levelized Cost of Energy Analysis-Version 15.0.” (21 pages)</p> <p>NC Clean Energy Technology Center. “Commercial Guide to the Federal Investment Tax Credit for Solar PV.” (6 pages)</p> <p>National Renewable Energy Laboratory. “Federal Tax Incentives for Energy Storage Systems.” (1 page)</p> <p>Optional:</p> <p><i>For those without previous finance knowledge, Investopedia.com has articles on relevant topics including:</i></p> <p>Fernando, Jason. “Internal Rate of Return (IRR).” (N.pag)</p> <p>Fernando, Jason. “Net Present Value (NPV).” (N.pag)</p>	<p>Assignment #1: Basic Excel financial model</p> <p>Storyboard (Part 2)</p>

		Hargrave, Marshall. "Weighted Average Cost of Capital (WACC)." (N.pag) Heyford, Shauna Carther. "Understanding the Time Value of Money." (N.pag)	
Five 2/21	<p>Financial Modeling for Energy Projects (L3, L4)</p> <p>Topics: *How to model financial transactions generally *How to do a detailed financial model of an energy project *How to determine a levelized cost of energy (LCOE) *The overall structure of project finance transactions</p> <p>Activities: *Recap of Prior Lecture *Lecture *Discussion *Group Formation</p>	<p>Wilson Sonsini Goodrich & Rosati. "Project Finance Primer for Renewable Energy and Clean Tech Projects." (20 pages)</p> <p>Clean Energy States Alliance. "A Homeowner's Guide to Solar Finance: Leases, Loans, and PPAs." (16 pages)</p> <p>Optional: Lazard. "Lazard's Levelized Cost of Hydrogen Analysis-Version 2.0." (16 pages) Lazard. "Lazard's Levelized Cost of Storage Analysis-Version 7.0." (35 pages)</p>	
Six 2/28	<p>Review of Key Financing Concepts (L3, L4)</p> <p>Topics: * Review key concepts discussed in class</p> <p>Activities: *Recap of Prior Lecture *Discussion</p>	n/a	
Seven 3/7	<p>Opportunities and Challenges of Clean Energy (L5)</p> <p>Topics: *Applicability of project finance in developing renewables *Ways in which early-stage companies/ technologies are financed *Financing of mature/ late-stage companies</p> <p>Activities: *Lecture *Discussion *Group Meeting Time *Guest Speaker I</p>	n/a	<p>Assignment #2: Levelized cost of energy models</p> <p>Group presentation synopsis</p>
3/14	- NO CLASSES (Spring Break) -		

<p>Eight 3/21</p>	<p>Rate Design and the Financing of Distributed Energy Resources (L5)</p> <p>Topics: *Basics of setting rates for electricity *Complexities of rate design *Distributed energy resources (DERs) *Rate design issues that are relevant to DER economics and possible future rate design approaches</p> <p>Activities: *Recap of Prior Lecture *Lecture *Discussion</p>	<p>Environment America. “The True Value of Solar.” (19 pages)</p> <p>Lazar, Jim. “Teaching the ‘Duck’ to Fly, Second Edition.” (5 pages)</p> <p>Optional (as a reference guide for particular topics where you would like additional information):</p> <p>NARUC. “Distributed Energy Resources Rate Design and Compensation.” (181 pages)</p>	<p>Assignment #3: Financial model for a clean energy project</p>
<p>Nine 3/28</p>	<p>Financing Mechanisms for Clean Energy (L6)</p> <p>Activities: *Recap of Prior Lecture *Lecture *Discussion *Guest Speaker II</p>	<p>Norton Rose Fulbright. “Corporate Renewable PPAs – a framework for the future?” (5 pages)</p> <p>Wilson Sonsini Goodrich & Rosati. “Innovations and Opportunities in Energy Efficiency Finance.” (32 pages)</p>	
<p>Ten 4/4</p>	<p>Electric Vehicles and the Grid (L5, L6)</p> <p>Topics: * Importance of transportation in general, and automobiles in particular, as a use of energy and source of emissions *EV opportunities and challenges</p> <p>Activities: *Recap of Prior Lecture *Lecture *Discussion *Guest Speaker III</p>	<p>Fitzgerald, Garrett, Chris Nelder and James Newcomb. “Electric Vehicles as Distributed Energy Resources.” (4 pages)</p> <p>U.S. Energy Information Administration. “Use of energy explained: Energy use for transportation (basic). (3 pages)</p> <p>U.S. Energy Information Administration. “Use of energy explained: Energy use for transportation (in depth).” (3 pages)</p>	<p>Assignment #4: Quantitative and qualitative short answer questions</p>
<p>Eleven 4/11</p>	<p>Building Energy Efficiency (L5, L6)</p> <p>Topics: *Importance of buildings in aggregate energy use and some of the various factors driving energy use *Differences between new buildings and existing buildings *Additional benefits of building energy efficiency and the general process *Case studies of building energy efficiency</p> <p>Activities: *Recap of Prior Lecture *Lecture</p>		

	*Discussion *Class Exercise		
Twelve 4/18	Equity, Environment and Economics (L5, L6) Topics: *Historical inequities in energy generation, transmission, and distribution *Environmental justice concerns *Challenges in achieving equity while pursuing environmental and economic goals of clean energy transition * How the clean energy transition fits into the UN Sustainable Development Goals (SDG) framework Activities: *Recap of Prior Lecture *Discussion *Guest Speaker(s) IV(, V)		Assignment #5: Analytical case study
Thirteen 4/25	GROUP PRESENTATIONS (L1-L6) Activities: *Group Presentations/Q&A	n/a	Group Presentation: first set of teams*
Fourteen 5/2	GROUP PRESENTATIONS (L1-L6) Activities: *Group Presentations/Q&A *Course Recap	n/a	Group Presentation: second set of teams*

* Group presentation order based on random selection, although attempts will be made to accommodate bona fide scheduling concerns. Class may need to be extended past 8pm one or both days to accommodate all presentations.

Course Policies

Participation and Attendance

You are expected to complete all assigned readings, attend all class sessions, participate in class, and engage actively and cooperatively with others in completing the final group presentation. In particular, please be especially attentive to guest speakers, and develop appropriate questions in advance. If you need to miss a class for any reason, please discuss the absence with the instructor in advance.

Late work

There will be no credit granted to any written assignment that is not submitted on the due date noted in the course syllabus without advance notice and permission from the instructor. Assignments submitted late with permission from the instructor will normally be graded down one letter grade (e.g., from an A to a B) absent extenuating circumstances.

Citation & Submission

All written assignments must cite sources (use any acceptable citation style e.g., APA, MLA), and be submitted to the course website (not via email).

School and University Policies and Resources

Copyright Policy

Please note—Due to copyright restrictions, online access to this material is limited to instructors and students currently registered for this course. Please be advised that by clicking the link to the electronic materials in this course, you have read and accept the following:

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials. Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

Academic Integrity

Columbia University expects its students to act with honesty and propriety at all times and to respect the rights of others. It is fundamental University policy that academic dishonesty in any guise or personal conduct of any sort that disrupts the life of the University or denigrates or endangers members of the University community is unacceptable and will be dealt with severely. It is essential to the academic integrity and vitality of this community that individuals do their own work and properly acknowledge the circumstances, ideas, sources, and assistance upon which that work is based. Academic honesty in class assignments and exams is expected of all students at all times.

SPS holds each member of its community responsible for understanding and abiding by the SPS Academic Integrity and Community Standards posted at <https://sps.columbia.edu/students/student-support/academic-integrity-community-standards>. You are required to read these standards within the first few days of class. Ignorance of the School's policy concerning academic dishonesty shall not be a defense in any disciplinary proceedings.

Diversity Statement

It is our intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength and benefit. It is our intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture.

Accessibility

Columbia is committed to providing equal access to qualified students with documented disabilities. A student's disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process. For more information regarding this service, please visit the University's Health Services website: <https://health.columbia.edu/services/ods/support>.

Names/Pronouns

You deserve to be addressed in a manner that reflects your identity. You are welcome to tell me your pronoun(s) and/or name (if different from University records) at any time, either in person or via email.

Discrimination

We embrace the diversity of gender, gender identity & expression, sex, sexual orientation, race, ethnicity, national origin, age, religion, disability status, family status, socioeconomic background, and other visible and non-visible identities. Columbia University does not tolerate unlawful discrimination, discriminatory harassment, sexual assault,

domestic violence, dating violence, stalking, or sexual exploitation and all such conduct is forbidden by Columbia University Policy.

Duty to Report

You deserve a University community free from discrimination, harassment, and gender-based misconduct including sexual harassment, sexual assault, domestic and dating violence, stalking, and sexual exploitation. It is therefore University policy to require Columbia faculty and staff to report to EOAA any instance or allegation of prohibited conduct involving any undergraduate or any graduate student that is disclosed to, observed by, or otherwise known to that employee. This requirement to report is in place to help ensure that students are provided appropriate resources and to allow the University to mitigate harm to our community.

Confidential Resources

There are confidential resources on campus who do not have a Duty to Report, including:

- * Sexual Violence Response & Rape Crisis/Anti-Violence Support Center (SVR)
- * Ombuds Office
- * Medical Services
- * University Counseling and Psychological Services
- * University Pastoral Counseling
- * Columbia Office of Disability Services

University employees working in a confidential capacity will not report information shared with them.

Inclusion

In the M.S. in Sustainability Management program, faculty and staff are committed to the creation and maintenance of “inclusive learning” spaces – classrooms and other places of learning where you will be treated with respect and dignity, and where all individuals are provided equitable opportunity to participate, contribute, and succeed.

All students are welcome regardless of race/ethnicity, gender identities, gender expressions, sexual orientation, socio-economic status, age, disabilities, religion, regional background, Veteran status, citizenship status, nationality and other diverse identities that we each bring to class.

Class Recordings

All or portions of the class may be recorded at the discretion of the Instructor to support your learning. At any point, the Instructor has the right to discontinue the recording if it is deemed obstructive to the learning process.

If the recording is posted, it is confidential and it is prohibited to share the recording outside of the class.

SPS Academic Resources

The Office of Student Affairs provides students with academic counseling and support services such as online tutoring and career coaching: <https://sps.columbia.edu/students/student-support/student-support-resources>.

Columbia University Information Technology

[Columbia University Information Technology](#) (CUIT) provides Columbia University students, faculty and staff with central computing and communications services. Students, faculty and staff may access [University-provided and discounted software downloads](#).

Columbia University Library

[Columbia's extensive library system](#) ranks in the top five academic libraries in the nation, with many of its services and resources available online.

The Writing Center

The Writing Center provides writing support to undergraduate and graduate students through one-on-one consultations and workshops. They provide support at every stage of your writing, from brainstorming to final drafts. If you would like writing support, please visit the following site to learn about services offered and steps for scheduling an appointment. This resource is open to Columbia graduate students at no additional charge. Visit <http://www.college.columbia.edu/core/uwp/writing-center>.

Career Design Lab

The Career Design Lab supports current students and alumni with individualized career coaching including career assessment, resume & cover letter writing, agile internship job search strategy, personal branding, interview skills, career transitions, salary negotiations, and much more. Wherever you are in your career journey, the Career Design Lab team is here to support you. Link to <https://careerdesignlab.sps.columbia.edu/>

Netiquette

Any online sessions in this course will be offered through Zoom, accessible through Canvas. A reliable Internet connection and functioning webcam and microphone are required. It is your responsibility to resolve any known technical issues prior to class. Your webcam should remain turned on for the duration of each class, and you should expect to be present the entire time. Avoid distractions and maintain professional etiquette.

Please note: Instructors may use Canvas or Zoom analytics in evaluating your online participation.

More guidance can be found at https://jolt.merlot.org/vol6no1/mintu-wimsatt_0310.htm

Netiquette is a way of defining professionalism for collaborations and communication that take place in online environments. Here are some Student Guidelines for this class:

- Avoid using offensive language or language that is not appropriate for a professional setting.
- Do not criticize or mock someone's abilities or skills.
- Communicate in a way that is clear, accurate and easy for others to understand.
- Balance collegiality with academic honesty.
- Keep an open-mind and be willing to express your opinion.
- Reflect on your statements and how they might impact others.
- Do not hesitate to ask for feedback.
- When in doubt, always check with your instructor for clarification.