**Master of Science in Sustainability Management**

**Sustainability Metrics SUMA K5TBA1**

**Wednesdays 6:10-8:00pm**

**3 credits**

**Elective**

**Instructors:** Guo Dong, [guodong@columbia.edu](mailto:guodong@columbia.edu); Sonay Aykan, [sonay\_aykan@colpal.com](mailto:sonay_aykan@colpal.com)

**Office Hours:** TBA

**Response Policy:** TBA

**Facilitator/Teaching Assistant, if applicable:** TBA

**Office Hours:** TBA

**Response Policy:** TBA

# Course Overview

The urgency to tackle sustainability-related global problems has revealed the growing need to create, maintain and analyze data on environmental and social issues with robust methodologies. The availability of large datasets and advanced data tools such as GIS, machine learning, and blockchain has expanded our capabilities for quick and agile decision-making in the corporate and urban space. However, more data does not necessarily mean better solutions.

This course will explore the relationship between sustainability and data from corporate and urban perspectives, focusing on how data is created, analyzed and used to make decisions. The course will start by revisiting different definitions of sustainability to outline the theoretical premises on which current data practices and policies are built. It will highlight the importance of actionable data, purpose-driven analysis and the selection of proper indicators. Moreover, students will learn how to use different datasets and calculation guidelines to assess corporations and cities’ environmental, and social footprint. This will help students gain the knowledge of a vast array of data sources such as World Bank Open Dataset, UN SDG Indicators, WRI Aqueduct, Bloomberg ESG data and Water Risk Monatizer; and process these data through suitable methodologies including life cycle assessment (LCA), environmental footprint assessment, scenario analysis and behavioral science to identify the sustainability-related risks and opportunities. The course will also present practical examples of the collection and reporting process of the urban and corporate data through GRI, SASB, TCFD, CDP and other reporting frameworks, providing insights into the concepts of data cleanliness, robustness, materiality analysis and stakeholder focus. Students will apply this new knowledge for exploring the growing investor interest in the sustainability data and the emerging financial tools to monetize risks and opportunities in the environmental, social and governance (ESG) space through ETFs, mutual funds and Green Bonds. The last portion of this course will have a special focus on the innovative data solutions used to tackle the climate, water and human rights-related problems at supply chains with examples from Scope-3 emission calculations.

This course will be offered in the Spring Semester, and in person.

# Learning Objectives

L1: Identify and distinguish different approaches to sustainability assessment.

L2: Use open-source datasets on sustainability and calculation guidelines to assess the sustainability performances of corporations, cities, and communities.

L3: Devise solutions to complex sustainability problems using data-literacy, due-diligence, teamwork, and technical skills with R, Python, GIS, Business BI, and other available tools.

# Readings

**Required Readings:**

Baumann, H., Tillman A., (2004), *The Hitchhiker's Guide to LCA - An orientation in LCA methodology and application,* Professional Publishing House (Chapters TBD)

Bell, S., & Morse, S. (2008). *Sustainability Indicators—Measuring the Immeasurable*? *2nd Edition. P3-13*. Earthscan. [DG1]

Better Business Better World (The report of the Business & Sustainable Development Commission): https://sdgs.un.org/sites/default/files/publications/2399BetterBusinessBetterWorld.pdf

Bloomberg Gender Equality Index: https://assets.bbhub.io/company/sites/46/2021/05/1121150\_BBGT\_2021GEI\_Updte\_GenderReportFrame\_FNL.pdf

Bloomberg vs. Capital IQ vs. FactSet vs. Thomson Reuters Eikon: <https://www.wallstreetprep.com/knowledge/bloomberg-vs-capital-iq-vs-factset-vs-thomson-reuters-eikon/>

Bose, S. (2020). Evolution of ESG Reporting Frameworks. In Esty, D. C., Cort, T. (Eds.). *Values at Work* (pp 13-33). Palgrave Macmillan

Bose, S., Guo, D., & Simpson, A. (2019). The Financial Ecosystem: the Role of Finance in Achieving Sustainability. Chapter 11. Palgrave Macmillan.

Bose, S., Guo, D., & Simpson, A. (2019). The Financial Ecosystem: the Role of Finance in Achieving Sustainability. P122-131. Palgrave Macmillan.

Boulanger, P.-M. (2008). Sustainable development indicators: a scientific challenge, a democratic issue. Surveys and Perspectives Integrating Environment and Society, 1(1). <https://journals.openedition.org/sapiens/166>

Busch, T. and G. Friede (2018). "The Robustness of the Corporate Social and Financial Performance Relation: A Second‐Order Meta‐Analysis." Corporate Social Responsibility & Environmental Management 25(4): 583-608

Case Study: Vans Supply Chain Visualization: <https://storymaps.arcgis.com/stories/17e9e9b5973549f4a0924813c098b13a>

Cohen, S., & Guo, D. (2021) The Sustainable City, 2nd Edition. Chapter 1. Columbia University Press.

China Sustainable Development Indicator System. (2020). The Earth Institute, Columbia University, China Center on International Economic Exchanges.

Elkington, John, Corporate Strategy in the Chrysalis Economy, Corporate Environmental Strategy, Volume 9, Issue 1, 2002, Pages 5-12, ISSN 1066-7938**.**

ESG Investing: Practices, Progress and Challenges (pp. 14-67): <https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf>

Esty, D. C., (2020). Creating Investment-Grade Corporate Sustainability Metrics. In Esty, D. C., Cort, T. (Eds.). *Values at Work* (pp 51-66). Palgrave Macmillan

The famine in Somalia should not have come as a surprise:

<https://www.theguardian.com/commentisfree/2011/jul/28/somalia-famine-warning-systems-failing>

The Greenhouse Gas Protocol (Chapter TBD): <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>

GRI 1 Foundation

GRI 3 Material Topics 2021

Select from standards: GRI 2 General Disclosures, GRI Topic Disclosures

How a Living Wage Differs From a Minimum Wage and Why It Should Be a Business Imperative: <https://justcapital.com/news/what-is-a-living-wage-and-why-is-it-important-to-business/>

Living Wage Calculator Methodology:<https://livingwage.mit.edu/resources/Living-Wage-Users-Guide-Technical-Documentation-2021-05-21.pdf>

Pathfinder Framework: Guidance for the Accounting and Exchange of Product Life Cycle Emissions <https://www.wbcsd.org/contentwbc/download/13299/194600/1>

Rate the Rankers: <https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sustainability-ratetheraters2020-report.pdf>

RSPO Standard 2020 (pp. 17 - 23): <https://rspo.org/library/lib_files/preview/1045>

SASB’s Approach to Materiality for the Purpose of Standards Development

Proposed Changes To The SASB Conceptual Framework & Rules Of Procedure

SDG Good Practices: A compilation of success stories and lessons learned in SDG implementation: https://sdgs.un.org/sites/default/files/2020-11/SDG%20Good%20Practices%20Publication%202020.pdf

Sheffi, Y. and Blanco, E, S. (2018). Impact Assessment, *Balancing Green* (pp 55-90). The MIT Press, Cambridge, Massachusetts

Sheffi, Y. and Blanco, E, S. (2018). The Structure of Supply Chains, *Balancing Green* (pp 31-55). The MIT Press, Cambridge, Massachusetts

Steps Towards A Living Wage in Global Supply Chains: <https://oxfamilibrary.openrepository.com/bitstream/handle/10546/336623/ib-steps-towards-living-wage-global-supply-chains-101214-en.pdf;jsessionid=28C67734DDCD939A38D6DD111596C299?sequence=1>

TCFD Implementing the Recommendations (pp. 1-24): <https://www.fsb.org/wp-content/uploads/P141021-4.pdf>

Tesco drops carbon-label pledge (news article): <https://www.theguardian.com/environment/2012/jan/30/tesco-drops-carbon-labelling>

The thorny truth about socially responsible investing: <https://www.vox.com/the-goods/22714761/esg-investing-divestment-fossil-fuels-climate-401k>

The Triple Bottom Line: What Is It and How Does It Work? <https://www.ibrc.indiana.edu/ibr/2011/spring/pdfs/article2.pdf>

UN SDGs (select one): <https://sdgs.un.org/goals>

Unilever CDP 2020 Climate response (Select sections TBD): <https://www.unilever.com/Images/unilever-cdp-climate-2020_tcm244-558529_en.pdf>

Using The Pressure-State-Response Model To Develop Indicators Of Sustainability: <http://documentacion.ideam.gov.co/openbiblio/bvirtual/017931/DocumentosIndicadores/Temasvarios/Docum26.pdf>

Utz, S. and M. Wimmer (2014). "Are they any good at all? A financial and ethical analysis of socially responsible mutual funds." Journal of Asset Management 15(1): 72-82

Villena, V. H., and Gioia, D. A., (2020). *Operations And Supply Chain Management: A More Sustainable Supply Chain*, Harvard Business Review.

Wackernagel, M., Beyers, B. (2019), Area as a Currency, How much Biocapacity Does a Person Need,  *Ecological Footprint: Managing our Biocapacity Budget (pp. 15-37)* Gabriola Island, BC Canada, New Society Publishers.

Volumetric Water Benefit Accounting (VWBA): A Method For Implementing and Valuing Water Stewardship Activities: <https://www.wri.org/research/volumetric-water-benefit-accounting-vwba-method-implementing-and-valuing-water-stewardship>

Wackernagel, M., Beyers, B. (2019), Footprint - Why?, Area as a Currency, How much Biocapacity Does a Person Need, Footprint Compass: How much Biodiversity Do we Need for a Good Life?, *Ecological Footprint: Managing our Biocapacity Budget* (pp. 1-37, 95-111) Gabriola Island, BC Canada, New Society Publishers.

Water Footprint Network: <https://waterfootprint.org/en/>

Water Footprint ASsessment Manual: <https://waterfootprint.org/media/downloads/TheWaterFootprintAssessmentManual_2.pdf>

Why Living Wages Should Matter To Your Business <https://socapglobal.com/2017/10/living-wages-matter-business/>

Wilkinson, A. and Kupers, R. (2013), *Managing Uncertainty:* *Living in the Futures,* Harvard Business Review.

Project ROI Report: http://www.impactroiglobal.com/project-roi/

Women's Empowerment and Business: 2020 Trends and Opportunities: <https://www.unglobalcompact.org/library/5738>

World Employment Social Outlook (2018) (pp 1-53): <https://sdgs.un.org/sites/default/files/publications/2517wcms_615594.pdf>

The 2020 Atlas of Sustainable Development Goals: Stories and insights through innovative visuals: <https://blogs.worldbank.org/opendata/2020-atlas-sustainable-development-goals-stories-and-insights-through-innovative-visuals>

**Optional Readings:**

A materiality analysis framework to assess sustainable development goals of banking sector through sustainability reports, Sustainable Production and Consumption, Volume 27, 2021, Pages 1775-1793, ISSN 2352-5509. <https://www.sciencedirect.com/science/article/pii/S2352550921001329>

Castellani V., Sala S. (2012), *Ecological Footprint and Life Cycle Assessment in the sustainability assessment of tourism activities, Ecological I ndicators*, Volume 16, pp. 135-147. (<https://www.sciencedirect.com/science/article/pii/S1470160X11002469>)

Eleni Sardianou, Athanasia Stauropoulou, Konstantinos Evangelinos, Ioannis Nikolaou,

Environmental, Social And Governance: What Is ESG Investing?: <https://www.forbes.com/advisor/investing/esg-investing/>

HEDIGER, W. (2006), WEAK AND STRONG SUSTAINABILITY, ENVIRONMENTAL CONSERVATION AND ECONOMIC GROWTH. Natural Resource Modeling, 19: 359-394. <https://doi.org/10.1111/j.1939-7445.2006.tb00185.x>

Pierini V. I., Mazzeo N., Cazenave M., Semmartin M., (2021) Waste generation and pro-environmental behaviors at household level: A citizen science study in Buenos Aires (Argentina), *Resources, Conservation and Recycling,* Volume 170, <https://www.sciencedirect.com/science/article/pii/S0921344921001671>

SBTi Net Zero Criteria: <https://sciencebasedtargets.org/resources/files/Net-Zero-Standard-Criteria.pdf>

**Library of Tools and Datasets:**

* WRI Aqueduct: <https://www.wri.org/aqueduct>
* Data World: <https://data.world/>
* Open LCA: <https://www.openlca.org/>
* Open SDG Data Hub: <https://unstats-undesa.opendata.arcgis.com/>
* World Bank Open Data: <https://data.worldbank.org/>
* The 2020 Atlas of Sustainable Development Goals: Stories and insights through innovative visuals: <https://blogs.worldbank.org/opendata/2020-atlas-sustainable-development-goals-stories-and-insights-through-innovative-visuals>
* UN SDG Indicators: <https://unstats.un.org/sdgs/UNSDG/IndDatabasePage>
* MIT En-Roads Scenario Analysis Tool: <https://en-roads.climateinteractive.org/scenario.html?v=21.9.0>
* OECD Sustainability Datasets: <https://www.oecd.org/greengrowth/publicationsdocuments/datasets/>
* Water Risk Monatizer: <https://www.smartwaternavigator.com/>
* Hunger Map: <https://hungermap.wfp.org/>
* Measuring Success: Tracking the Progress of the Sustainable Development Goals <https://storymaps.arcgis.com/stories/ffa9380903e84bd2bfdd00deeaf46333>

# Assignments and Assessments

Metric memo (15%) / Due on Third Week(L1, L3) **-** Students will create a mini-report to describe their positive and negative impact on one of the 17 UN SDGs and a goal to improve this impact. The report will have:

* Student’s definition of sustainability and how the selected SDG fits into this definition: why is it important?
* Calculation of students impact with a clear description of the methodology and the variables used
* Results of calculations
* Description of a goal to improve this impact and the indicator that will be used to track progress towards this goal.
* Learnings throughout this process

The report will be 2-3 pages and the findings / learnings will be discussed during the class.

Midterm: Risks and Opportunities Report (30%) / Due on Sixth Week(L1, L2, L3)- Students will prepare a detailed report on the sustainability-related risks or opportunity of an S&P 500 Company or a global city of their choice. This report will describe the importance of chosen risk or opportunity in relation to stakeholders, existing sustainability frameworks and business operations (materiality assessment) and provide quantitative analysis of the potential impacts of it. Students are expected to present their findings through various data tools and visualizations, without being limited to companies' existing disclosures, sustainability reports or other sources of information. This report will be used as the basis for the final project.

Data collection exercise (15%) / Due Ninth Week (L1, L2) -Students will work individually to find data on a range of sustainability indicators of their choosing for a pair of cities they think are comparable in scope and scale, and to compare the sustainability performances of these cities in a certain year. Every student is required to write a short memo that summarizes the result, describes the data sources, and any adjustments that have to be made in scale and unit in order to make the data comparable across cities.

Final project (30%) / Due Final Week (L1, L3)- Students will work as teams to propose collaborative solutions to the problems identified during midterms. Each team will have at least one student who focused on a corporation and a student who focused on a global city. Suggested collaborative solutions will include both corporate and urban policy components, supported with a roadmap and quantitative analysis. Each project team will present their initial recommendations in the final class with an accompanying paper no longer than 8-10 pages due on the final class. Presentations should be no longer than 15 minutes and will be followed by 5 minutes of Q&A.

Class participation (10%) (L1) - Class participation will be evaluated on a scale of 0-100 and all students are expected to contribute to the classroom discussion. During these discussions, students will be expected to reflect on the pre-class readings and present a critical view based on these readings. Students are welcomed to bring their skills they have learned from other classes, especially those related to data analysis and sustainability. Attendance will count as part of the participation grade and late attendance to classes will impact the grade. Students are expected to inform the instructors via email in advance and within a reasonable timeframe in case of impossibility to attend a class. Failure to attend a class without an excuse will result in deduction of the participation grade. Late submission of assignments will result in a reduction of 10% of the grade.

# Grading

# The final grade will be calculated as described below, and the grade weight for each assignment is as described in the assignment section.

# 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** |
| Metric Memo | 15% | Individual |
| Midterm | 30% | Individual |
| Data collection exercise | 15% | Individual |
| Final project | 30% | Group |
| Participation | 10% | Individual |
|  |  |  |

# Course Schedule/Course Calendar

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Topics and Activities** | **Readings (due on this day)** | **Assignments (due on this date)** |
| 1/19 | **Sustainability and Data**  **Questions to be addressed:**   * What are the different definitions of sustainability and sustainable development? * How did the definition of sustainability evolve? * What is data? * Why is understanding data important? * What is sustainability data specifically? | * Bell, S., & Morse, S. (2008). *Sustainability Indicators—Measuring the Immeasurable*? *2nd Edition. P3-13*. Earthscan. [DG1] * The Triple Bottom Line: What Is It and How Does It Work? <https://www.ibrc.indiana.edu/ibr/2011/spring/pdfs/article2.pdf> |  |
| 1/26 | **Measuring Sustainability—Linking the Two Worlds**  **Questions to be addressed:**   * Development of indicators and indices * What is the purpose of sustainability data: Actionable data * Philosophy behind different assessment methodologies:   + End-user Impact: Single variable assessment   + Life Cycle Assessment (LCA): Multivariable assessment   + Life Style Assessment: Behavioral Science   + PSR Approach * Using the right indicators: Signal or noise? | * Boulanger, P.-M. (2008). Sustainable development indicators: a scientific challenge, a democratic issue. Surveys and Perspectives Integrating Environment and Society, 1(1). <https://journals.openedition.org/sapiens/166> * John Elkington, Corporate Strategy in the Chrysalis Economy, Corporate Environmental Strategy, Volume 9, Issue 1, 2002, Pages 5-12, ISSN 1066-7938**,** * The 2020 Atlas of Sustainable Development Goals: Stories and insights through innovative visuals: <https://blogs.worldbank.org/opendata/2020-atlas-sustainable-development-goals-stories-and-insights-through-innovative-visuals> * Using The Pressure-State-Response Model To Develop Indicators Of Sustainability: <http://documentacion.ideam.gov.co/openbiblio/bvirtual/017931/DocumentosIndicadores/Temasvarios/Docum26.pdf> * The famine in Somalia should not have come as a surprise: <https://www.theguardian.com/commentisfree/2011/jul/28/somalia-famine-warning-systems-failing>   **Optional Readings:**   * HEDIGER, W. (2006), WEAK AND STRONG SUSTAINABILITY, ENVIRONMENTAL CONSERVATION AND ECONOMIC GROWTH. Natural Resource Modeling, 19: 359-394. <https://doi.org/10.1111/j.1939-7445.2006.tb00185.x>   **Tools**:   * Measuring Success: Tracking the Progress of the Sustainable Development Goals <https://storymaps.arcgis.com/stories/ffa9380903e84bd2bfdd00deeaf46333> |  |
| 2/2 | **Measuring the Environmental impact: Holistic approach to sustainability (LCA and other methodologies) / Measuring the product & service level data**  **Questions to be addressed:**   * What is Ecological Footprint * What is a life cycle analysis (LCA) * Environmental topics for corporate focus: Climate Change, Water Management, Waste and Effluents, Deforestation, Biodiversity * Existing standards to assess environmental footprint * How should a corporation decide on which methodology to use for measuring its environmental impact? * What tools are available to measure environmental risks and impacts? * Analyzing and visualizing environmental data (GIS, Python and R libraries on environmental data, Google Studio). Case studies. | * Wackernagel, M., Beyers, B. (2019), Footprint - Why?, Area as a Currency, How much Biocapacity Does a Person Need, Footprint Compass: How much Biodiversity Do we Need for a Good Life?, *Ecological Footprint: Managing our Biocapacity Budget* (pp. 1-37, 95-111) Gabriola Island, BC Canada, New Society Publishers. * Baumann, H., Tillman A., (2004), *The Hitchhiker's Guide to LCA - An orientation in LCA methodology and application,* Professional Publishing House (Chapters TBD) * Sheffi, Y. and Blanco, E, S. (2018). Impact Assessment, *Balancing Green* (pp 55-90). The MIT Press, Cambridge, Massachusetts * Wackernagel, M., Beyers, B. (2019), Area as a Currency, How much Biocapacity Does a Person Need,  *Ecological Footprint: Managing our Biocapacity Budget (pp. 15-37)* Gabriola Island, BC Canada, New Society Publishers. * Volumetric Water Benefit Accounting (VWBA): A Method For Implementing and Valuing Water Stewardship Activities: <https://www.wri.org/research/volumetric-water-benefit-accounting-vwba-method-implementing-and-valuing-water-stewardship> * Water Footprint Network: <https://waterfootprint.org/en/> * Water Footprint ASsessment Manual: <https://waterfootprint.org/media/downloads/TheWaterFootprintAssessmentManual_2.pdf> * The Greenhouse Gas Protocol (Chapter TBD): <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf> * Tesco drops carbon-label pledge (news article): https://www.theguardian.com/environment/2012/jan/30/tesco-drops-carbon-labelling   **Optional:**   * Castellani V., Sala S. (2012), *Ecological Footprint and Life Cycle Assessment in the sustainability assessment of tourism activities, Ecological I ndicators*, Volume 16, pp. 135-147. (<https://www.sciencedirect.com/science/article/pii/S1470160X11002469>) * Pierini V. I., Mazzeo N., Cazenave M., Semmartin M., (2021) Waste generation and pro-environmental behaviors at household level: A citizen science study in Buenos Aires (Argentina), *Resources, Conservation and Recycling,* Volume 170, <https://www.sciencedirect.com/science/article/pii/S0921344921001671> * SBTi Net Zero Criteria: <https://sciencebasedtargets.org/resources/files/Net-Zero-Standard-Criteria.pdf>   **Tools:**   * Open LCA: <https://www.openlca.org/> * Footprint Network Open Data: <https://data.footprintnetwork.org/#/> * Global Footprint Network Calculator: <https://www.footprintnetwork.org/resources/footprint-calculator/> * WRI Water Risk Atlas and other tools: <https://www.wri.org/aqueduct> * Satte of Global Climate Change: <https://storymaps.arcgis.com/stories/6942683c7ed54e51b433bbc0c50fbdea> | Metric memo due |
| 2/9 | **Measuring Social Impact**  **Questions to be addressed:**   * How can social impact / footprint be calculated? * Social topics for corporate focus: Diversity and Inclusion, Living Wage, Workplace Ethics, Training and Education, Human Rights, Freedom of Association, Responsible Marketing * Existing standards to assess social footprint * How should a corporation decide on which methodology to use for measuring its social impact? * What tools are available to measure social impact? * Analyzing and visualizing social data. (GIS, Python and R libraries on environmental data, Google Studio). Case studies. | * World Employment Social Outlook (2018) (pp 1-53): <https://sdgs.un.org/sites/default/files/publications/2517wcms_615594.pdf> * Better Business Better World (The report of the Business & Sustainable Development Commission): https://sdgs.un.org/sites/default/files/publications/2399BetterBusinessBetterWorld.pdf * Living Wage Calculator Methodology:<https://livingwage.mit.edu/resources/Living-Wage-Users-Guide-Technical-Documentation-2021-05-21.pdf> * How a Living Wage Differs From a Minimum Wage and Why It Should Be a Business Imperative: <https://justcapital.com/news/what-is-a-living-wage-and-why-is-it-important-to-business/> * Why Living Wages Should Matter To Your Business <https://socapglobal.com/2017/10/living-wages-matter-business/> * Steps Towards A Living Wage in Global Supply Chains: https://oxfamilibrary.openrepository.com/bitstream/handle/10546/336623/ib-steps-towards-living-wage-global-supply-chains-101214-en.pdf;jsessionid=28C67734DDCD939A38D6DD111596C299?sequence=1 * Women's Empowerment and Business: 2020 Trends and Opportunities: <https://www.unglobalcompact.org/library/5738> * Bloomberg Gender Equality Index: https://assets.bbhub.io/company/sites/46/2021/05/1121150\_BBGT\_2021GEI\_Updte\_GenderReportFrame\_FNL.pdf   **Tools:**   * Living Wage Calculator: <https://livingwage.mit.edu/> * US Census Data: <https://www.census.gov/en.html> * Hunger Map: <https://hungermap.wfp.org/> * Call to Action: End Environmental Racism Now: <https://storymaps.arcgis.com/stories/da0df1524c704b488d79bb3e656addb3?_lrsc=3a74f8ba-3735-4900-9084-134c8d7823c8> |  |
| 2/16 | **Sustainable Development Goals (SDGs)**  **Questions to be addressed:**   * What are SDGs and how were they developed? * How are SDGs implemented at the national and corporate level, what are the tools to help implementation and reporting? * What is the progress being made? * Discrepancies between national goals, goals at local levels and the public? * What are their problems? | * Bose, S., Guo, D., & Simpson, A. (2019). *The Financial Ecosystem: the Role of Finance in Achieving Sustainability*. P100-105. Palgrave Macmillan. |  |
| 2/23 | **Corporate Reporting: Reporting frameworks and materiality analysis**  **Questions to be addressed:**   * How can sustainability be measured at the corporate level? * What to measure: Materiality Analysis, focusing on what matters * How can sustainability be reported: Reporting frameworks (GRI, SASB, TCFD, UN SDGs). * Who are the stakeholders: Defining the purpose of the report. * Applications of the indicators to the reporting frameworks. * Inner workings of the reporting process: Negotiation and Crossfunctional Engagement | * Bose, S. (2020). Evolution of ESG Reporting Frameworks. In Esty, D. C., Cort, T. (Eds.). *Values at Work* (pp 13-33). Palgrave Macmillan * GRI 1 Foundation * GRI 3 Material Topics 2021 * Select from standards: GRI 2 General Disclosures, GRI Topic Disclosures * SASB’s Approach to Materiality for the Purpose of Standards Development * Proposed Changes To The SASB Conceptual Framework & Rules Of Procedure * UN SDGs (select one): <https://sdgs.un.org/goals> * SDG Good Practices: A compilation of success stories and lessons learned in SDG implementation: https://sdgs.un.org/sites/default/files/2020-11/SDG%20Good%20Practices%20Publication%202020.pdf   **Optional:**   * Eleni Sardianou, Athanasia Stauropoulou, Konstantinos Evangelinos, Ioannis Nikolaou, * A materiality analysis framework to assess sustainable development goals of banking sector through sustainability reports, Sustainable Production and Consumption, Volume 27, 2021, Pages 1775-1793, ISSN 2352-5509. https://www.sciencedirect.com/science/article/pii/S2352550921001329   **Tools:**   * GRI Standards: <https://www.globalreporting.org/how-to-use-the-gri-standards/resource-center/?g=8ee95e9c-809c-4b2f-9ca2-9cf8de760a60&id=13673> * SASB Materiality Map: <https://materiality.sasb.org/materiality.html> * SASB Materiality Finder: <https://www.sasb.org/standards/materiality-finder/find/> | Midterm due |
| 3/2 | **Sustainability Indicators and Cities**  **Questions to be addressed:**   * What is a sustainable community/city? * Why is city a crucial unit in achieving sustainability? * How can sustainability be measured at the city level? * How can we measure the impact of climate change, air, water, and migration on cities? * How and where can we collect data at the city level? | * Cohen, S., & Guo, D. (2021) The Sustainable City, 2nd Edition. Chapter 1. Columbia University Press. * China Sustainable Development Indicator System. (2020). The Earth Institute, Columbia University, China Center on International Economic Exchanges. |  |
| 3/9 | **Sustainability in the Investment Space: Bloomberg, Thomson Reuters, NASDAQ, Indices and ETFs**  **Questions to be addressed:**   * What do investors want to know about sustainability * Data warehouses for sustainability assessment: Bloomberg, Refinitive, FactSet * Raters and Rankers Space: DJSI, CDP, Sustainalytics, Just Capital, MSCI, ISS * What data should corporations focus on to meet investor expectations? * Integrity of the scoring frameworks * Where do the data end up: ETFs and Mutual Funds | * ESG Investing: Practices, Progress and Challenges (pp. 14-67): <https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf> * Esty, D. C., (2020). Creating Investment-Grade Corporate Sustainability Metrics. In Esty, D. C., Cort, T. (Eds.). *Values at Work* (pp 51-66). Palgrave Macmillan * Unilever CDP 2020 Climate response (Select sections TBD): <https://www.unilever.com/Images/unilever-cdp-climate-2020_tcm244-558529_en.pdf> * Rate the Rankers: <https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sustainability-ratetheraters2020-report.pdf> * Bloomberg vs. Capital IQ vs. FactSet vs. Thomson Reuters Eikon: <https://www.wallstreetprep.com/knowledge/bloomberg-vs-capital-iq-vs-factset-vs-thomson-reuters-eikon/> * The thorny truth about socially responsible investing: <https://www.vox.com/the-goods/22714761/esg-investing-divestment-fossil-fuels-climate-401k>   **Optional:**   * Environmental, Social And Governance: What Is ESG Investing?: <https://www.forbes.com/advisor/investing/esg-investing/>   **Tools**   * Bloomberg Terminal ESG Screen (Or available terminal through SUMA) |  |
| 3/16 | Spring Break, no class |  |  |
| 3/23 | **Linking Sustainability Data to Financial Performance**  **Questions to be addressed:**   * Frameworks for the Aggregation of Financial and Non-Financial Metrics * What is the relationship between non-financial indicators and the financial performance of companies? * Does a focus on ESG generate financial returns in the short/long run? | * Bose, S., Guo, D., & Simpson, A. (2019). The Financial Ecosystem: the Role of Finance in Achieving Sustainability. P122-131. Palgrave Macmillan. * Busch, T. and G. Friede (2018). "The Robustness of the Corporate Social and Financial Performance Relation: A Second‐Order Meta‐Analysis." Corporate Social Responsibility & Environmental Management 25(4): 583-608 * Utz, S. and M. Wimmer (2014). "Are they any good at all? A financial and ethical analysis of socially responsible mutual funds." Journal of Asset Management 15(1): 72-82 | Data collection exercise due |
| 3/30 | **Linking Sustainability Data to Business Performance: Scenario Analysis / Risk Assessment / Impact Valuation**  **Questions to be addressed:**   * What are the short and long term business implications of climate change? * What are different climate-related scenarios and their potential impacts * How can sustainability-related risks and opportunities be monetized (Water Risk, Climate Risk, Social Risks) * Assessing the impacts of sustainability policies: Cost and Benefit Calculations * Deeper dive in SASB, TCFD and TNFD Frameworks * Risks and M&As: How ESG impacts these processes. * Sustainable Finance and Credit Ratings   **Guest Speaker:**  Karl Peterson, *Chief Sustainability Officer, Americas, at Societe Generale Corporate and Investment Banking - SGCIB* | * TCFD Implementing the Recommendations (pp. 1-24): <https://www.fsb.org/wp-content/uploads/P141021-4.pdf> * Wilkinson, A. and Kupers, R. (2013), *Managing Uncertainty:* *Living in the Futures,* Harvard Business Review. * Project ROI Report: http://www.impactroiglobal.com/project-roi/ |  |
| 4/6 | **Impact Evaluation for Impact Investing**  **Questions to be addressed:**   * Does impact investing really add value? * Why is measuring impact difficult? * What is the difference between measuring output and outcome? * What are the tools available for evaluating the social impact of investments? | * Bose, S., Guo, D., & Simpson, A. (2019). The Financial Ecosystem: the Role of Finance in Achieving Sustainability. Chapter 11. Palgrave Macmillan. |  |
| 4/13 | **Supply Chain Sustainability: Measuring beyond boundaries**  **Questions to be addressed:**   * What is supply chain sustainability? * Measuring the climate change, water and human rights impacts on supply chain * Collecting data from the supply chain * Using advanced data analytics for supply chain sustainability assessment: GIS, Blockchain, Predictive Analytics * Supply chain engagement: How to turn data into actions? * Ensuring data integrity and data democratization for supply chain sustainability   **Guest Speaker: TBD** | * Sheffi, Y. and Blanco, E, S. (2018). The Structure of Supply Chains, *Balancing Green* (pp 31-55). The MIT Press, Cambridge, Massachusetts * Pathfinder Framework: Guidance for the Accounting and Exchange of Product Life Cycle Emissions <https://www.wbcsd.org/contentwbc/download/13299/194600/1> * RSPO Standard 2020 (pp. 17 - 23): <https://rspo.org/library/lib_files/preview/1045> * Villena, V. H., and Gioia, D. A., (2020). *Operations And Supply Chain Management: A More Sustainable Supply Chain*, Harvard Business Review. * Case Study: Vans Supply Chain Visualization: <https://storymaps.arcgis.com/stories/17e9e9b5973549f4a0924813c098b13a> |  |
| 4/20 | **Final Presentations** |  | Final project due |
| 4/27 | **Final Presentations** |  |  |

# Course Policies

## *Participation and Attendance*

You are expected to complete all assigned readings, attend all class sessions, and engage with others in class discussions. 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.

## *Citation & Submission*

All written assignments must use standard citation format (e.g., MLA, APA, Chicago), cite sources, and be submitted to the course website or in hardcopies.

# 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>.

## 

## *School Policies and Expectations:*

## Accessibility Statement – I want you to succeed in this course. Contact disability@columbia.edu<mailto:disability@columbia.edu> for learning accommodations.

## *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](https://cuit.columbia.edu) (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](https://columbiait.onthehub.com).

## *Columbia University Library*

[Columbia's extensive library system](https://library.columbia.edu/) 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*

*[Only applies to courses using online platforms]*

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.