

# Green Finance Microcredential

## Professional Certificate Program

### Course Overview

#### Program Description

This intensive microcredential provides finance professionals with comprehensive knowledge and practical skills in green finance, sustainable investment, and climate risk assessment. The program covers green bonds, ESG integration, climate risk frameworks, renewable energy project finance, and global regulatory standards.

#### Program Details

- **Duration:** 6 weeks intensive (80 contact hours)
- **Format:** In-person instruction with hands-on workshops
- **Schedule:** 13-14 hours per week
- **Target Audience:** Finance professionals transitioning to sustainable finance
- **Prerequisites:** None (beginner-friendly with comprehensive foundation building)
- **Credential:** University-issued Professional Certificate in Green Finance

#### Learning Objectives

Upon completion, participants will be able to:

1. Understand core concepts, instruments, and markets in green finance
2. Analyze and apply ESG data for investment screening and portfolio construction
3. Assess climate-related financial risks using TCFD and scenario analysis frameworks
4. Develop financial models for renewable energy projects and green investments
5. Navigate global regulatory frameworks including EU Taxonomy, SFDR, and emerging standards
6. Evaluate green bonds and sustainable debt instruments
7. Apply practical tools (Python, Excel, ESG platforms) for green finance analysis

#### Assessment Components

- Case Study Analyses (3 assignments): 30%
- Financial Modeling Project: 25%
- Research Paper: 25%
- Final Presentation: 20%

## **Required Tools and Software**

- Microsoft Excel (financial modeling)
- Python 3.x with pandas, numpy, matplotlib libraries
- Access to ESG data platforms (MSCI, Refinitiv, or Bloomberg ESG - institutional access provided)
- PDF reader for course materials

# Weekly Schedule

## Week 1: Green Finance Fundamentals (14 hours)

### Learning Objectives:

- Define green finance and understand its evolution
- Identify key stakeholders and market participants
- Understand the business case for sustainable finance
- Recognize different types of green financial instruments

### Session Breakdown:

*Session 1.1 - Introduction to Green Finance (3 hours)*

- Definition and scope of green finance
- Historical development and market growth
- Climate change and the financial system
- Sustainable Development Goals (SDGs) and finance

*Session 1.2 - Green Finance Ecosystem (3 hours)*

- Market participants: issuers, investors, intermediaries
- Role of development finance institutions
- International organizations and standard-setters
- Public vs. private green finance

*Session 1.3 - Green Financial Instruments Overview (4 hours)*

- Green bonds and loans
- Sustainability-linked instruments
- Green equity and funds
- Carbon markets and credits
- Blended finance structures

*Session 1.4 - Workshop: Financial Fundamentals Review (4 hours)*

- Time value of money and discounting
- Bond pricing and yield calculations
- Portfolio theory basics
- Risk and return metrics
- Excel modeling foundations

### Readings:

- Berrou et al. (2019). “A taxonomy of green finance”
- Climate Bonds Initiative (2023). “Green Bond Market Summary”
- UNEP (2023). “Global Landscape of Climate Finance”

**Assignment:** None (foundation week)

## Week 2: Green Bonds and Sustainable Debt Instruments (14 hours)

### Learning Objectives:

- Understand green bond market structure and evolution
- Analyze green bond frameworks and use of proceeds
- Evaluate green bond pricing and performance
- Apply green bond principles and verification processes

### Session Breakdown:

#### *Session 2.1 - Green Bond Markets (3 hours)*

- Green bond market history and growth
- Market segmentation: sovereign, corporate, municipal
- Green Bond Principles (ICMA)
- Use of proceeds categories

#### *Session 2.2 - Green Bond Structuring and Issuance (4 hours)*

- Framework development
- External reviews and verification
- Second-party opinions
- Reporting and transparency requirements
- Case study: Major green bond issuance

#### *Session 2.3 - Green Bond Pricing and Performance (3 hours)*

- Greenium: myth or reality?
- Pricing analysis methodologies
- Performance comparison with conventional bonds
- Liquidity considerations

#### *Session 2.4 - Workshop: Green Bond Analysis (4 hours)*

- Hands-on: Analyzing green bond frameworks
- Excel exercise: Green bond pricing
- Group activity: Framework critique

### Readings:

- ICMA (2023). “Green Bond Principles”
- Flammer (2021). “Corporate green bonds” (Journal of Financial Economics)
- Zerbib (2019). “The effect of pro-environmental preferences on bond prices”

**Assignment 1 Due (End of Week 2):** Case Study Analysis - Green Bond Framework Evaluation

## Week 3: ESG Integration and Data Analysis (13 hours)

### Learning Objectives:

- Understand ESG rating methodologies and providers
- Apply ESG screening and integration techniques
- Use Python and ESG platforms for data analysis
- Evaluate materiality and ESG performance metrics

### Session Breakdown:

#### *Session 3.1 - ESG Frameworks and Ratings (3 hours)*

- ESG concepts and evolution
- Major ESG rating providers (MSCI, Sustainalytics, Refinitiv)
- Rating methodologies and controversies
- ESG data quality and comparability issues

#### *Session 3.2 - ESG Integration Strategies (3 hours)*

- Negative screening vs. positive screening
- ESG integration approaches
- Thematic investing
- Impact investing vs. ESG investing
- Materiality assessment

#### *Session 3.3 - Workshop: ESG Data Platforms (3 hours)*

- Hands-on: MSCI/Refinitiv platform navigation
- Data extraction and export
- Company ESG profiles analysis
- Sector comparison tools

#### *Session 3.4 - Workshop: Python for ESG Analysis (4 hours)*

- Python basics review
- pandas for ESG data manipulation
- Portfolio screening with Python
- Visualization with matplotlib
- Creating ESG scorecards

### Readings:

- Berg et al. (2022). “Aggregate confusion: ESG ratings”
- Eccles and Strohle (2018). “Exploring social origins in ESG”
- Khan et al. (2016). “Corporate sustainability: First evidence on materiality”

**Assignment 2 Due (End of Week 3):** Python ESG Portfolio Analysis Project

## Week 4: Climate Risk Assessment and TCFD (13 hours)

### Learning Objectives:

- Understand physical and transition climate risks
- Apply TCFD framework for climate risk disclosure
- Conduct scenario analysis for climate risks
- Quantify climate-related financial impacts

### Session Breakdown:

#### *Session 4.1 - Climate Risk Fundamentals (3 hours)*

- Physical risks: acute and chronic
- Transition risks: policy, technology, market, reputation
- Climate risk transmission channels
- Systemic risk considerations

#### *Session 4.2 - TCFD Framework (4 hours)*

- TCFD structure: governance, strategy, risk management, metrics
- Climate scenario analysis
- NGFS scenarios and applications
- Disclosure best practices
- Case study: Corporate TCFD report analysis

#### *Session 4.3 - Climate Risk Quantification (3 hours)*

- Climate Value-at-Risk (CVaR)
- Carbon footprinting methodologies
- Stranded asset analysis
- Physical risk modeling approaches

#### *Session 4.4 - Workshop: Scenario Analysis Exercise (3 hours)*

- Hands-on: Portfolio climate risk assessment
- Excel-based scenario modeling
- Group exercise: Sector-specific risk analysis

### Readings:

- TCFD (2017). “Final Report: Recommendations”
- Bolton et al. (2020). “The green swan” (BIS)
- Battiston et al. (2017). “A climate stress-test of the financial system”

**Assignment:** None (focus on midpoint integration)

## Week 5: Renewable Energy Project Finance (13 hours)

### Learning Objectives:

- Understand renewable energy technologies and economics
- Develop financial models for solar and wind projects
- Evaluate project risks and mitigation strategies
- Analyze power purchase agreements (PPAs)

### Session Breakdown:

#### *Session 5.1 - Renewable Energy Technologies (3 hours)*

- Solar PV: technology and cost trends
- Wind energy: onshore and offshore
- Energy storage and grid integration
- Emerging technologies: green hydrogen, geothermal

#### *Session 5.2 - Project Finance Fundamentals (3 hours)*

- Project finance structure and rationale
- Special purpose vehicles (SPVs)
- Debt-equity structures
- Risk allocation in project finance
- Offtake agreements and revenue certainty

#### *Session 5.3 - Renewable Energy Financial Modeling (4 hours)*

- Revenue modeling: capacity factors, degradation
- Cost structure: CAPEX, OPEX
- Debt sizing and sculpting
- Returns metrics: IRR, DSCR, NPV
- Sensitivity and scenario analysis

#### *Session 5.4 - Workshop: Solar Project Model (3 hours)*

- Hands-on: Building Excel model for solar project
- Case study: Real-world solar project evaluation
- Group work: Risk analysis

### Readings:

- IRENA (2023). “Renewable Power Generation Costs”
- Steffen (2020). “Estimating the cost of capital for renewable energy projects”
- Ameli et al. (2021). “Higher cost of finance exacerbates energy divide”

**Assignment 3 Due (End of Week 5):** Renewable Energy Project Financial Model

## Week 6: Regulatory Frameworks and Course Integration (13 hours)

### Learning Objectives:

- Navigate EU Taxonomy and SFDR requirements
- Understand global regulatory landscape
- Apply integrated green finance analysis
- Present comprehensive green finance strategies

### Session Breakdown:

#### *Session 6.1 - EU Green Finance Regulation (4 hours)*

- EU Taxonomy: structure and criteria
- Sustainable Finance Disclosure Regulation (SFDR)
- Corporate Sustainability Reporting Directive (CSRD)
- Compliance challenges and implementation

#### *Session 6.2 - Global Regulatory Landscape (3 hours)*

- US: SEC climate disclosure rules
- Asia: green taxonomies in China, Singapore, ASEAN
- Emerging markets: national green finance policies
- International coordination and convergence

#### *Session 6.3 - Integration Workshop (3 hours)*

- Cross-cutting themes review
- Integrated case study
- Career pathways in green finance
- Final project Q&A

#### *Session 6.4 - Final Presentations (3 hours)*

- Student presentations of final projects
- Peer feedback and discussion
- Course wrap-up and certification

### Readings:

- European Commission (2023). “EU Taxonomy Compass”
- Ehlers and Packer (2017). “Green bond finance and certification”
- Volz (2018). “Fostering green finance for sustainable development”

### Final Deliverables Due:

- Research Paper: Due end of Week 6
- Final Presentation: Delivered in Session 6.4



## Assessment Details

### Case Study Analyses (30% total)

#### Assignment 1: Green Bond Framework Evaluation (10%)

- Due: End of Week 2
- Length: 1500-2000 words
- Task: Analyze a real green bond issuance, evaluate framework against Green Bond Principles, assess use of proceeds alignment, review external verification

#### Assignment 2: ESG Portfolio Analysis (10%)

- Due: End of Week 3
- Format: Python Jupyter notebook with analysis
- Task: Build ESG-screened portfolio, compare performance with benchmark, analyze ESG score distributions, create visualization dashboard

#### Assignment 3: Renewable Energy Project Model (10%)

- Due: End of Week 5
- Format: Excel financial model with 2-page executive summary
- Task: Develop complete project finance model for solar/wind project, including sensitivity analysis and investment recommendation

### Research Paper (25%)

- Due: End of Week 6
- Length: 3500-4500 words
- Topic: Choose from provided list or propose custom topic
- Requirements: Academic rigor, minimum 15 peer-reviewed sources, original analysis
- Sample topics:
  - Climate risk integration in institutional portfolios
  - Green bond market development in emerging economies
  - Comparative analysis of ESG rating methodologies
  - Effectiveness of carbon pricing mechanisms
  - Blended finance structures for renewable energy

### Final Project and Presentation (45% total)

#### Financial Modeling Project (25%)

- Due: End of Week 6
- Format: Comprehensive Excel/Python model with documentation
- Options:
  - Green bond issuance structuring and pricing
  - Climate-aware portfolio optimization

- Renewable energy investment evaluation
    - ESG-integrated corporate valuation
  - Requirements: Complete model, assumptions documentation, sensitivity analysis, executive summary
- Final Presentation (20%)**
- Delivered: Session 6.4
  - Length: 15 minutes + 5 minutes Q&A
  - Content: Present financial modeling project findings, investment recommendation or strategy proposal
  - Format: Professional pitch-style presentation
  - Evaluation: Technical accuracy, clarity, practical applicability, presentation skills

# Required Reading List

## Core Textbooks (Recommended)

- Baker, M., Bergstresser, D., Serafeim, G., and Wurgler, J. (2022). *The Pricing and Ownership of U.S. Green Bonds*. Annual Review of Financial Economics.
- Giglio, S., Kelly, B., and Stroebe, J. (2021). *Climate Finance*. Annual Review of Financial Economics.

## Week-by-Week Academic Papers

### Week 1 - Foundations

- Berrou, R., Dessertine, P., and Migliorelli, M. (2019). “An overview of green finance.” *The Rise of Green Finance in Europe*.
- Sachs, J. D., et al. (2019). “Six transformations to achieve the SDGs.” *Nature Sustainability*.

### Week 2 - Green Bonds

- Flammer, C. (2021). “Corporate green bonds.” *Journal of Financial Economics*, 142(2), 499-516.
- Zerbib, O. D. (2019). “The effect of pro-environmental preferences on bond prices.” *Journal of Banking and Finance*, 98, 39-60.
- Tang, D. Y., and Zhang, Y. (2020). “Do shareholders benefit from green bonds?” *Journal of Corporate Finance*, 61, 101427.

### Week 3 - ESG

- Berg, F., Kolbel, J. F., and Rigobon, R. (2022). “Aggregate confusion: The divergence of ESG ratings.” *Review of Finance*, 26(6), 1315-1344.
- Khan, M., Serafeim, G., and Yoon, A. (2016). “Corporate sustainability: First evidence on materiality.” *The Accounting Review*, 91(6), 1697-1724.
- Dimson, E., Karakas, O., and Li, X. (2015). “Active ownership.” *Review of Financial Studies*, 28(12), 3225-3268.

### Week 4 - Climate Risk

- Bolton, P., et al. (2020). *The green swan: Central banking and financial stability in the age of climate change*. BIS.
- Battiston, S., et al. (2017). “A climate stress-test of the financial system.” *Nature Climate Change*, 7, 283-288.
- Krueger, P., Sautner, Z., and Starks, L. T. (2020). “The importance of climate risks for institutional investors.” *Review of Financial Studies*, 33(3), 1067-1111.

### Week 5 - Project Finance

- Steffen, B. (2020). “Estimating the cost of capital for renewable energy projects.” *Energy Economics*, 88, 104783.
- Ameli, N., et al. (2021). “Higher cost of finance exacerbates a climate investment trap in developing economies.” *Nature Communications*, 12, 4046.

### Week 6 - Regulation

- Ehlers, T., and Packer, F. (2017). “Green bond finance and certification.” *BIS Quarterly Review*.
- Volz, U. (2018). “Fostering green finance for sustainable development in Asia.” *ADB Working Paper Series*.

## Industry Reports and Guidelines

- Climate Bonds Initiative. (2023). “Green Bond Market Summary.”
- ICMA. (2023). “Green Bond Principles: Voluntary Process Guidelines.”
- TCFD. (2017). “Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures.”
- UNEP. (2023). “Global Landscape of Climate Finance.”
- IRENA. (2023). “Renewable Power Generation Costs.”
- European Commission. (2023). “EU Taxonomy for Sustainable Activities.”
- NGFS. (2023). “NGFS Climate Scenarios for Central Banks and Supervisors.”

## Course Policies

### Attendance

Attendance is mandatory for all sessions. Participants missing more than 10% of contact hours (8 hours) will not receive certification.

### Academic Integrity

All submitted work must be original. Proper citation is required for all external sources. Violations will result in failing grade and possible program dismissal.

### Late Submissions

Late assignments will be penalized 10% per day, up to 3 days. After 3 days, submissions will not be accepted without documented extenuating circumstances.

### Grading Scale

- 90-100%: Distinction
- 80-89%: Merit
- 70-79%: Pass
- Below 70%: Fail (no certificate awarded)

### Technical Support

Support for ESG platform access and software issues will be available via email and office hours.

### Feedback

Assignments will be returned with feedback within 10 business days of submission. Students are encouraged to attend office hours for detailed discussions.

## Instructor Contact Information

*[To be completed with instructor details]*

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*Note: This syllabus is subject to modification with advance notice. Updates will be communicated via email.*