

- a. Course Code: ESE-841
- b. Title: Carbon Markets
- c. Credit Hours: 3-0
- d. Objectives: As already mentioned under Section 3.
- e. Outcomes:

1. The graduate will be **able** to apply the fundamental economic principles that underpin carbon markets, including supply and demand dynamics, externalities, and the correction of market failures.
2. The graduate will be **able** to describe and critically evaluate regional, national, and international policy instruments and regulatory frameworks governing carbon markets.
3. The graduate will be **able** to assess the environmental, economic, and social impacts of carbon markets in the context of global climate change mitigation and sustainable development goals.
4. The graduate will be **able** to identify and anticipate emerging trends, innovations, and challenges in carbon markets, including the role of digital tools, blockchain, and prospects for global market integration.
5. The graduate will be able to describe the likely future trends in carbon market development.

- a. Contents with suggested contact hours

No.	Topics	Textbook	Contact Hours
1	<p>Climate Change and the Evolution of Carbon Markets</p> <ul style="list-style-type: none"> • Overview of climate change & the role of carbon markets • Why do carbon markets matter for policy and business, and how do they work? • Key milestones in the evolution of global carbon markets • Pakistan's climate challenges & opportunities in carbon markets 	BEH + FM + OO	6
2	Institutional and Regulatory Frameworks	BEH +	6

	<ul style="list-style-type: none"> • The economics and rational of carbon pricing: Carbon taxes vs. cap-and-trade systems • Market fundamentals: supply, demand, and price discovery • Externalities & market failures • Carbon credit price volatility and risk factors 	FM + OO	
3	Economic Foundations of Carbon Pricing Mechanisms <ul style="list-style-type: none"> • The economics of carbon pricing: Carbon taxes vs. cap-and-trade systems • Market fundamentals: supply, demand, and price discovery • Externalities and market failures • The rational for carbon pricing • Price versus quantity instruments • Carbon credit price volatility and risk factors 	BEH	3
4	Carbon Market Mechanisms and Project Lifecycle <ul style="list-style-type: none"> • Compliance vs. voluntary carbon markets • Carbon units: allowances, offsets, and credits • The lifecycle of a carbon market project • Characteristics of high-quality projects • Pakistan’s carbon market projects: steps and key stakeholders 	FM + BEH	6
5	Monitoring, Reporting, Verification (MRV) and Certification <ul style="list-style-type: none"> • Carbon accounting standards (e.g., ISO, Gold Standard, Verra) • MRV processes and challenges in developing economies, particularly Pakistan • Carbon markets in numbers (e.g., project volumes, pricing, sectors) • Digital MRV tools and blockchain innovations 	GB + TBD	6
6	Market Critiques, Ethical Risks, and Governance Challenges <ul style="list-style-type: none"> • Ethical considerations: carbon leakage, market manipulation, windfall profits, illiquidity, volatility, over-supply, uncertainty, etc. • Governance failures and lack of transparency in Pakistan • License to pollute debate • Global South and Pakistan perspectives on equity and fairness • Behavioral and political economy of carbon 	FM + GB + RA	6

	trading		
7	Carbon Markets as a Tool for SDGs and Just Transitions <ul style="list-style-type: none"> • Role of carbon markets in achieving SDGs, renewable energy, and energy efficiency in Pakistan • Linkages with ESG reporting, green bonds, and climate finance • Just transitions, green jobs, and energy equity 	BEH	3
8	Trends, Innovations, and Global Integration <ul style="list-style-type: none"> • Key emerging trends in carbon markets: blockchain, AI in MRV • The role of technological innovation in enhancing market efficiency in Pakistan • Future of global market linkages • International carbon clubs, cross-border trading, and Pakistan's participation 	WG	3
9	Pakistan's Experience, NDC Implementation, and Opportunities in Carbon Markets <ul style="list-style-type: none"> • Pakistan's updated NDCs, policy frameworks, and challenges in leveraging carbon markets • Institutional landscape: MoCC, PCCC, NEECA, etc. • Case studies: Sapphire Wind Farm, Pakarab Fertilizer, Delta Blue Carbon, CDM wind farms, or REDD+ pilots. 	MA	3
10	Carbon Market Simulation Activity <ul style="list-style-type: none"> • Hands-on trading simulation using MIT's Carbon Trading Simulator or Excel-based tool • Role-playing as regulators, buyers, and sellers in Pakistan's specific contexts • Post-simulation debriefs and reflection on Pakistan's market dynamics 	---	3
	Total		45

b. Details of lab work, and workshop practice (if applicable).

NIL

h. Recommended Reading (including Textbooks and Reference books with dates).

S.	Title	Author(s)	Assigned	Remarks
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No.			Code	
1	An Introduction to Carbon Markets (2023, 1 st Edition)	Tristan Derek Buckley	TDB	Text
2	Carbon Markets Around the Globe: Sustainability and Political Feasibility (2021, 1 st Edition, Edward Elgar Publishing)	S. Rudolph and E. Aydos	RA	Text
3	Carbon Markets in a Climate-Changing Capitalism (2019, 1 st Edition, Cambridge University Press)	G. Bryant	GB	Text
4	The Evolution of Carbon Markets: Design and Diffusion (2018, 1 st Edition, Routledge)	J. Wettestad and L. Gulbrandsen	WG	Text
5	The Paris Agreement on Climate Change: Analysis and Commentary (2017, 1 st Edition, Oxford University Press)	S. R. Wenham, M. A. Green, and M. E. Wat	WGW	Text
6	Carbon Markets: An International Business Guide (2009, 1 st Edition, Routledge)	A. Brohé, N. Eyre, and N. Howarth	BEH	Text (available in soft copy)
7	The Kyoto Protocol: International Climate Policy for the 21 st Century (1999, 1 st Edition, Springer Verlag)	S. Oberthür and H. E. Ott	OO	Text
8	Carbon Markets	B. Fonseca and E. Mogyorósy	FM	Reference
9	Carbon Markets in Pakistan: Policy Brief	A. Mahmood	MA	Reference
10	Decoding Carbon Markets: A Simple Guide to Understanding and Engaging in Carbon Trading	Sustainable Development Policy Institute (SDPI)	SDPI	Reference

11	Academic Research Articles from World-renowned Journals	---	---	Reference
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i. Assessments

Sr. No.	Assessment	Description	Weightage	Quantity
1	Midterm Exam	Covers concepts, theory, and policy frameworks	25%	1
2	Group Project	Design a carbon market or offset project (Pakistan-specific)	20%	2
3	Simulation Reflection Report	Simulation Reflection Report	10%	1
4	Case Study Presentation	Focused on a global or national carbon project	15%	1
5	Final Exam	Cumulative assessment	30%	1