

<b>Course title:</b> Energy and Carbon Markets				
<b>Course code:</b> ENR 167		<b>No. of credits:</b> 1	<b>L-T-P:</b> 14-01-00	<b>Learning hours:</b> 15
<b>Pre-requisite course code and title (if any):</b>				
<b>Department:</b> Sustainable Engineering				
<b>Course coordinator:</b> Dr Sapan Thapar			<b>Course instructor(s):</b> Dr Sapan Thapar	
<b>Contact details:</b> sapan.thapar@terisas.ac.in				
<b>Course type:</b> Core			<b>Course offered in:</b> Semester 2	
<b>Course description</b> Energy sector is associated with significant contributions to a country's carbon emissions. All countries that have ratified the Kyoto Protocol, are supposed to report their emissions to UNFCCC. In this course, the students shall be provided with an overview on global climate agreements, energy specific emissions, and tools and methodologies for accounting and reporting the emissions. They shall be apprised on the Indian GHG inventory and the initiatives to reduce the same. Carbon trading has been identified as a tool to reduce emissions. In this context, the students shall be taught about the various trading mechanisms along with their pricing structures.				
<b>Course objectives</b>				
<ul style="list-style-type: none"> <li>▪ Overview on Climate Change &amp; international agreements</li> <li>▪ Energy &amp; associated GHG emissions</li> <li>▪ Developing GHG Inventory &amp; Carbon Footprint Assessment,</li> <li>▪ Indian energy specific GHG inventory &amp; mitigation strategies</li> <li>▪ Role of Market based mechanisms in mitigation, including pricing, markets &amp; trading.</li> </ul>				
<b>Course content</b>				
Module	Topic	L	T	P
1	<b>Introduction – Climate Change</b> Climate change and greenhouse gas emissions International regime for climate stabilization Climate change Mitigation: NDCs and Net Zero Goal Market mechanisms under the Paris Climate Agreement Carbon capture, utilisation and storage (CCUS)	2	0	0
2	<b>Indian Context</b> National Action Plan on Climate Change Commitments under UNFCCC and Paris Agreement National GHG Inventory Estimation Existing energy related market mechanisms NDC goals for mitigation, Accounting and Reporting	3	0	0
3	<b>Carbon Assessment Techniques</b> Gases, Sectors, and methodologies Policies, regulations and protocols Estimation of carbon footprint IPCC guidelines for National GHG inventories Case Study	3	1	0
4	<b>Carbon Markets</b> Carbon Economics - Price incentive or cost Market Based Mechanisms – Cap & Trade, Carbon Trading Voluntary and compliance Carbon Markets Carbon Markets in India- existing mechanisms and future design Introduction to Internal Carbon Pricing & Carbon labeling Carbon Tax & Price Adjustments	6	0	0

	<b>Total</b>	<b>14</b>	<b>1</b>	<b>0</b>
<b>Evaluation criteria</b>				
	Minor test 1:	20%		
	Minor test 2:	20%		
	Assignment/ Tutorials:	20%		
	Major test:	40%		
<b>Learning outcomes</b>				
After completing this course, students would be able to:				
<ul style="list-style-type: none"> <li>▪ Estimate Carbon/ GHG emissions of a particular scenario</li> <li>▪ Understand the concept of carbon pricing</li> <li>▪ Understand working of carbon markets with the various trading techniques</li> </ul>				
<b>Pedagogical approach</b>				
The course will be delivered through classroom lectures with relevant case studies				
<b>Materials</b>				
<b>Textbooks</b>				
<ul style="list-style-type: none"> <li>• UNDP, Carbon Handbook, United Nations Development Programme (2014)</li> <li>• Gupta M. Restricting Greenhouse Gas Emissions: Economic Implications for India, New Delhi. (2006)</li> <li>• Gilbert M. Masters and Wendell P. Ela. Introduction to Environmental Engineering and Science. 3rd edition. PHI learnings, New Delhi (2007)</li> </ul>				
<b>Suggested readings</b>				
<ul style="list-style-type: none"> <li>• BEE (India) - National Carbon Markets Scheme</li> <li>• MoEFCC (India) GHG Inventory</li> <li>• NAPCC, India</li> <li>• UNFCCC - National Inventory Submissions</li> <li>• World Bank - State and Trends of Carbon Pricing (Report)</li> </ul>				
<b>Journals</b>				
<ul style="list-style-type: none"> <li>• Climate Dynamics</li> <li>• Combustion Technologies</li> <li>• Energy Policy</li> <li>• Global Environmental Change</li> <li>• Renewable Energy</li> <li>• Review of environmental economics and policy</li> <li>• Sustainable and Renewable Energy reviews</li> </ul>				
<b>Additional information (if any)</b>				
<b>Student responsibilities</b>				
The students are expected to submit assignments in time.				

### Course reviewers

- Mr. RR Rashmi, IAS (Retd.), Distinguished Fellow and Director, Earth Science and Climate Change, TERI
- Dr Sacchidananda Mukherjee, Associate Professor, National Institute of Public Finance and Policy
- Mr. Jatin Kapoor, Head - Climate Transactions, Emergent Ventures India