

Indian Institute of Technology Kanpur
Proposal for a New Course

Course Number	MBAXXX
Course Title	Economics and Policy for Industrial Decarbonisation (EPID)
Credits	5 (3-0-0-0)
Duration of Course	Half Semester
Proposing Department	Department of Management Sciences (DoMS)
Pre-requisites	
Other Interested Faculty	-
Departments/IDPs which may be interested in the proposed course	SEE, Kotak School of Sustainability

Course Description: This course will introduce students to economics and policy perspective to industrial decarbonisation and equip them with social science perspective in general. While the technological solution is at the centre of the low emission growth objectives of countries and companies, it is increasingly being realised that technology alone will not lead us to the developmental goals. There are commercial aspects and enabling conditions that industries need to understand, respond and adapt for surviving in low carbon world. The course takes a sectoral deep dive into the transition pathways. Using case-based approach the course covers an introduction to social science perspective of decarbonisation, the role of public policy and civil society.

Learning Outcomes

Upon successful completion, students will have the knowledge and skills to:

1. Understand the economics and policy of industrial decarbonisation and its implications for business, including its key principles and methods.
2. Use transition pathways principles to analyse sectoral developments in low carbon world.
3. Recognise, understand, and explain the complexity of linkages between drivers, pressures, impacts and responses in different industrial sectors like transport, electricity, industry etc.

Content

S. No.	Broad Title	Topics	No. of Lectures
1	Introduction to economics and policy aspects in industrial decarbonisation	<ul style="list-style-type: none"> • A brief introduction to industrial decarbonisation, key concepts and drivers of industrial decarbonisation: KAYA identity, IPAT • Key macroeconomic and microeconomic concepts, how economics and policy views climate change and growth in low carbon world. • Policies on industrial decarbonisation in the developed industries and comparison with the policies in the developing countries. 	4
2	Electricity generation	<ul style="list-style-type: none"> • Electricity Demand: electricity demand drivers, regional per capita electricity use, uncertainties in predicting demand, demand from data centres and data collection challenges 	3

		<ul style="list-style-type: none"> • Energy Supply: renewables vs fossil fuels, supply chain of gas, role of clean electricity to meet additional demand, changes in global electricity generation, state involvement as a potential option to help reduce the cost of capital, emission intensity of power sector in developed vs developing nations • Electricity prices: wholesale prices in different regions, household electricity prices and affordability, industrial electricity prices and competitiveness • Cases on electricity transition 	
3	Transport Sector	<ul style="list-style-type: none"> • Transport structure mix across different regions: aviation, international shipping, electric vehicle, trucks and buses, cars and vans, and rail • Emissions from transport sector, energy consumed, international collaboration • Key economic and supply chain challenges in technologies like electric vehicles, hydrogen, biofuels • Corporate strategy in transport sector, role of policy instruments in transport emission mitigation, investment • Case study in transport 	3
4	Iron and steel sector	<ul style="list-style-type: none"> • Role of iron and steel in clean energy transition • Policy framework to reduce industry emissions • Role played by different decarbonisation strategies like electrification, scrap use, hydrogen-based steel making, carbon capture and utilisation. • Private sector strategies like Net-Zero Steel, First Movers Coalition, SteelZero Initiative • International Collaboration like 2023 G7 Industrial Decarbonisation Agenda, Climate Club, Industrial Deep Decarbonisation Initiative, Breakthrough Agenda • Case study in metal sector 	4
		Total Number of Lectures	14

The duration of each lecture is 1 hours 15 minutes

C) Prerequisite: Some background in technological aspects of electricity production, transport and metal.

D) Short Summary for including in the Courses of Study Booklet:

The aim of this course is to orient students toward the current energy transition debate from economics and policy perspective. The course will introduce transition pathways for industries that contribute to emissions of any economy namely: electricity production, road transport and metal sector. Based on sectoral modal, the students will undertake bottom-up analysis of decarbonisation strategies. This will students develop holistic understanding of decoupling growth and emissions.

Recommended Books/References:

- IPCC III working group on mitigation
- Articles by World Business Council for Sustainable Development and other relevant case studies
- IEA World Energy Outlook
- IEA Electricity

Proposer: Mousami Prasad

Date: October 29, 2024

DPGC convener:

Date:

This course is approved/not approved.

Chairperson, SPGC

Date: