Course title: Renewable energy policies and regulations			
Course code: ENR 154	**No. of credits:** 3	**L-T-P:** 32-13-00	**Learning hours:** 45
Pre-requisite course code and title (if any): N.A.			
Department: Sustainable Engineering			
Course coordinator: Dr. Sapan Thapar	**Course instructor(s):** Dr. Sapan Thapar		
Contact details: sapan.thapar@terisas.ac.in			
Course type: Programme Core	**Course offered in:** Semester 1		

Course description

The course is meant to comprehensively impart knowledge on the overall policy and regulatory environment governingrenewable energy development in the country. The students will also be sensitized to emergent trends competitive bidding in Solar and Wind based capacity addition.

The course will cover national and state policies, regulatory and legislative frameworks on Renewable Energy. Some ofthese policies and guidelines emanate from an overarching Act such as the Electricity Act and policies such as the National Climate Change Policy. The policies, regulations and guidelines determining grid integration of renewable energy such as electricity off-take approaches, tariffs, control period and even technical requirements like maintenance of grid frequency in a certain bandetc. It is also important to have an understanding of the institutional architecture that enables implementation of the policies and regulation as much as the policies in force.

The course will present a policy and regulatory framework for renewable energy as it is practiced in India. However,similar frameworks either exist in other developed and developing countries will also be studied for possible adoption in India.

Course objectives

- To impart knowledge on the overall policy, regulatory and institutional framework on Renewable Energy
- To provide understanding of the main drivers that influence Renewable Energy policy formulation
- To provide insights on emergent policy trends with regard to generation and procurement of renewable energy
- To describe and analyse policy instruments used in promotion of renewable energy in India and globally

Course contents

Module	Topic	L	T	P
1	**Energy Statistics, Regulatory Bodies & Entities** Introduction to Indian energy sector with focus on renewable energy Key Statistics - Installed capacity, Generation Mix, Consumption Trends Entities –GENCOS, TRANSCOs, DISCOMs, Power Trading Companies Regulators- CERC, SERC, FoR, BEE Institutions- MoP, MNRE, CEA, NISE, NIWE, NIBE, State Agencies Public Sector Entities (NTPC, NHPC, IREDA, SECI, PGCIL, POSOCO, REC, PFC) Private Players - IPPs, EPC contractors, System Integrators, Financiers, etc.	10	0	0
2	**Indian Energy Legislations, Policies & Programmes** Global Overview - RE policies and regulatory structures Electricity Act, National Tariff Policy, National Electricity Policy & Plan National Action Plan on Climate Change National Solar Mission, including Grid and Off-grid schemes and Programmes Programme on Wind Power, including repowering, hybrid and off-shore wind Programme on Biomass Sector including cogeneration & cofiring Programme on Waste to Energy	14	4	0

	Programmes on Small Hydro and other RE technologies RE Enablers – Subsidies, FiT, VGF, Bundling Scheme, Auctions/ Bidding, low-cost funds, accelerated depreciation and other fiscal options Promotional measure like must run, merit order dispatch and deemed generation Regulations on banking, wheeling and open access CERC/ SERC Regulations/ Guidelines – REC-RPO, RE Tariff Electricity Trading, including Green Exchange Markets, Open Access Captive / Group Captive Projects & Corporate PPAs Grid Code, including Scheduling and Forecasting Green Energy Corridors Green Hydrogen Mission EV Policies & Schemes Hybrid, Storage & RTC Mode Projects Emerging areas - smart metering, remote monitoring, DSM, ancillary services, etc.			
3	**Policies on Distributed/ Decentralized/ Off grid Sectors** Solar Rooftop - Policy framework, Status, Central and state government policies Micro and Mini grids –Scope, Significance and challenges Rural electrification schemes: Saubhagya, RDSS, and Solar Off-grid Programme Schemes on decentralized RE systems Biofuels schemes, including Satat, Gobardhan PM-KUSUM Scheme for Agriculture Small solar plants (EESL Scheme) Socio-economic impact of decentralized renewable energy programmes	8	2	0
4	**Seminar** Case Study - Group Activity to analyse RE policies and regulations (Select countries & Indian states)	0	7	0
		32	**13**	**0**

Evaluation criteria:

- Minor test 1: 20% (after completion of module 1)
- Minor test 2: 20% (after completion of module 2)
- Assignment: 30% (after completion of module 1 and 2)
- Major test: 30% (after completion of all modules)

Learning outcomes:

- Enhanced understanding of renewable energy policy and regulatory environment including global developments
- Sound understanding of the institutional frameworks w.r.t. Renewable Energy
- Sound understanding of policy and regulatory framework for grid connected and off grid renewable energy

Pedagogical approach:

A combination of class-room interactions, tutorials, assignments and projects.

Materials:
Recommended readings/Reading Materials/Reference Documents:

CEA Annual Reports
CEA Monthly Executive Summary Reports
CEA Monthly RE Power Generation Reports
Electricity Act 2003
Energy Statistics, MOSPI, GoI
IRENA – RE Capacity Statistics
IRENA – Off-grid renewable energy statistics 2021
IRENA – Renewable Power Generation Costs in 2020
REN-21 – Renewables Global Status Report
National Electricity Policy, 2021
Solar Park Scheme
MNRE Off-shore Wind Policy
MNRE Wind Repowering Scheme
Off-grid and Decentralized Solar PV Applications Programme
Solar Rooftop Scheme Phase-II
CERC RE Tariff Order
MNRE PM-KUSUM Scheme
MoP – Hydrogen Policy
National Biofuel Policy
Annual Reports of MoP, MNRE and its institutions SERC RE Tariff Orders
IEGC
REC-RPO Scheme, CERC
CEEW Report – How India's Solar and Wind Policies Enabled its Energy Transition
Indian Energy Exchange, Monthly Reports
GTAM & GDAM Markets, IEX

References:
Electricity Act 2003
CERC Regulations on Renewable Energy

Journals and Magazines:
Energy Policy
Energy for Sustainable
Development
Renewable Energy

Additional information (if any): NA

Student responsibilities:

Attendance, feedback, discipline: as per university rules.

Course Reviewers:

1. Mr. J K Jethani, Director, Ministry of New and Renewable Energy, New Delhi
2. Mr. Shirish Garud, Director, The Energy and Resources Institute, New Delhi