NMNE -102	Introduction to Mining, Energy, and Climate Change	3	0	0	3

Course Objective

This course will discuss on different mining and energy scenarios and their contribution for increasing the carbon footprint which in turn produces global warming. All important research and development contributing to reduction of its effect will be presented in the class. In addition, India's commitment for reduction of carbon footprint and the actions planned for implementation will be the subject of discussion for energizing the young students for their contribution in thoughts and actions for fulfilling the international commitments for saving the Mother Earth.

Learning Outcomes

Upon successful completion of this course, students will:

- Facts of global warming and its significance; the need for addressing the emerging environmental issues.
- Role of mining for energy security and potential threat to the climate
- Role of Renewable energy and its share in energy basket
- Different methods for Carbon dioxide sequestration and reduction of carbon footprint
- India's commitment for augmenting global warming.

Units	Course Contents	Lecture Hours	Learning Outcomes
Unit-1	**Basics of Global Warming and Climate change** Global warming and glacial change, the rise of carbon, Alpine "Hot Box" experiment, the atmosphere as a dam built across a river, Royal Institution Laboratory and findings of John Tyndall, Guy Callendar, Arrhenius etc., the age of discovery : findings of Roger Rivelle, Keelings Curve, large scale geophysical experiments, modelling of climate and road to Rio, journey to Paris protocol	12	It will enable student to understand the facts of global warming and climate change in historical perspective and the present scenario.
Unit-2	**Coal and Uranium Mining for Energy security** Coal mining and electrical age, Wizards of Menlo Park, Battle of the currents, Metering of the energy, Regulatory bargain, The growth of electrical age, Uranium mining and nuclear cycle, Nuclear navy, Disaster of Three Mile Island, Chernobyl Disasters and Fukushima Daiichi, Growth of India's coal and uranium mining industry	10	The student will understand the significance of coal and uranium mining for energy security and potential dangers and disasters with nuclear options.

Unit-3	**Role of renewable energy** Solar, Wind, Biofuels, Biomass, Geothermal, Hydropower and other renewable energy options; Developments in different fields and their contribution to the energy basket	10	It will help student understand the role and significance and limitations of Renewable energy and its share in energy basket.
Unit-4	**Carbon dioxide sequestration and reduction of carbon footprint** Different methods for carbon dioxide sequestration: Geological reserves, marine water and other methods for sequestration, other uses of carbon dioxide for reduction of global warming	06	The student will understand the different methods for Carbon dioxide sequestration and reduction of carbon footprint.
Unit-5	**India's commitment for augmenting global warming** Paris protocol, India's commitment for reduction of global warming and actions envisaged	04	It will make student familiar with latest strategies adopted by India to fulfil its commitment for reduction global warming.

Text Books

1. Future of Energy : Brian F. Towler (2014)
2. The Quest: Energy, Security, and the Remaking of the Modern World : Daniel Yergin (2011)