RAFFLES UNIVERSITY

Japanese Zone, NH-48, Neemrana-301705

Ph.D. Course Work Syllabus

Paper-II Electrical Engineering

Paper Code-(Ph.D.-102)

Contact Hours: 4 Hrs/ week **Continuous Assessment: 40 Marks**

Credit: 4 **End Term Exam: 60 Marks**

Unit - I

Issues surrounding energy use and production

Principle of energy conservation, renewability of energy, energy use patterns and the inequality in energy use, Sustainability and challenges for sustainability, energy as driver of development, carbon cycle, emission of greenhouse gases from energy sector

Unit - II

Quantification of material and energy flows and the importance of thermodynamics

Material and energy balances, importance of the second law of thermodynamics, Heat and power integration – overview of thermodynamics of heat engines, generation of electricity, different heat engines

Unit - III

Sustainable Energy Systems

Environmental challenges in energy, environmental and socio-economic impact of non-renewable energy production technologies, carbon dioxide, air, water and land use, greenhouse gases and climate change, Energy sources and carriers, energy uses, applications of phase change materials for sustainable energy, Economic dimensions and environmental dimensions of energy use, carbon trading and carbon pricing

Unit - IV

Renewable Energy

The role of various renewable energy technologies (i.e. wind, hydro, solar, biomass, wave etc.) in meeting our future energy needs

Unit - V

Nuclear Energy

The promise and problems of nuclear energy

End Use: Technologies for the transportation sector
Sustainable transportation: accessibility, mobility, and derived demand, energy policy

Reference Books:

Text Books

1. [1] Sorensen B. (2010); Renewable Energy, Fourth Edition, Academic press
2. [2] Ristinen R. A. and Kraushaar J. J. (1998): Energy and the Environment, John Wiley Reference

Books

1. [1] Kaushika N. D. and Kaushik K. (2004); Energy, Ecology and Environment: A Technological Approach, Capital Publishing
2. [2] Dessler A. (2011); Introduction to Modern Climate Change, Cambridge University Press
3. [3] Ravindranath N. H., Usha R. Natarajan K. B. and Monga P. (2000); Renewable Energy and Environment: A Policy Analysis for India, Tata-McGraw Hill