Introduction to Renewable Energy Technologies

3 ECTS

Lecturer

Prof. Dr. Tara Chandra Kandpal
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Curriculum Vitae

Prof. Tara Chandra Kandpal received his Ph. D. degree in solar energy from the Indian Institute of Technology Delhi, India in 1980 and is currently a professor at the same institute. Dr. Kandpal has been on visiting assignments to the Brace Research Institute, McGill University, Canada, regularly taught courses to the students of European Solar Energy Engineering at Dalarna University, Sweden during 2001-2013, and has been a guest professor at the Technical University of Kaiserslautern, Germany for several short terms during 2011-2014.

Prof. Kandpal's fields of research include Solar Concentrators, Performance Characterization of Solar Thermal Technologies, the Economics and Financing of Renewable Energy Technologies, and Renewable Energy Education. Prof. Kandpal has published over a hundred research papers, co-authored/ co-edited seven books, and has provided guidance to fifteen doctoral and over forty master's students.

Research specializations

Solar thermal utilization, the economics and financing of renewable energy technologies, rural energy systems, renewable energy education and training.

Selected publications

Over one hundred research publications in international journals of repute in the areas of optics of solar concentrators, testing of solar cookers, the techno-economics of renewable energy technologies, renewable energy education, and rural energy systems.

Course description

Aim: To introduce issues in the financing of renewable energy technologies (RETs) and to enable students to analyze the effect of various financing modalities on the financial attractiveness of renewable energy investments.

Learning Outcomes: On successful completion of the course, the students should be able to:

(a) Understand project financing terminology

(b) Understand and evaluate various financing mechanisms for RETs.

(c) Analyze and explain the effect of different modalities of financing on the unit cost of electricity delivered and also on the financial attractiveness of investments.

Contents:

Renewable sources of energy, their origin and basic characteristics; Solar radiation; Solar collectors- flat plate, evacuated tubular and concentrating type; Thermal applications of solar energy; Solar cells and their applications; Thermo-chemical and bio-chemical conversion of biomass, bio-diesel; Wind energy conversion systems; Geothermal energy utilization; Ocean thermal energy conversion; Energy from tides and waves.

Basic-Literature for preparation

John Twidell and Tony Weir, Renewable Energy Resources, Taylor and Francis (2006).

Godfrey Boyle, Renewable Energy: Power for a Sustainable Future, Oxford University Press (2004)