Certificate Course in Renewable Energy Resources under CBCS pattern (w.e.f. 2022-2023 onwards)

Department of Physics, Kakatiya University, Warangal

Certificate Course in Renewable Energy Resources

Course Duration:3 Months

Paper code	Comp.	Title of the paper	Internal Exam Marks	End Exam Max. Min.		Total Max. Marks	Total Min. Marks	No. of credits
	Theory Marks Marks Marks Marks					Warks	Warks	
C-1	C01	Paper –I:Solar Energy	10	40	16	50	20	02
C-2	C02	Paper- II: Wind,Bio- Mass, Geothermal and Ocean Energy	10	40	16	50	20	02
Total 100								04

G. Padmaja 11/10/2022

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Paper-I: Solar Energy

UNIT I: Principles of Solar Radiation and Collection (Qualitative only)10Hrs

Non-renewable energy resources – Principles of power generation and transmission. A model of conventional thermal power plant. Advantages and disadvantages of conventional power plants. Role and potential of new and renewable sources, the solar energy option, environmental impact of solar power, physics of the sun, the solar constant, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT II:

Solar Energy Storage and Applications :Solar energy collectors - Flat plate and concentration collectors, classification of concentration collectors and orientation, advanced collectors. Different sensible, latent heat and stratified storage, solar ponds. Solar Applications – solar heating/ cooling technique, solar distillation and drying, photovoltaic energy conversion.

TEXT BOOKS:

- 1. Non-Conventional Energy Sources G.D Rai, Khanna Publishers
- 2. Renewable Energy Resources-Twidell & Wier, CRC Press (Taylor & Francis)

REFERENCE BOOKS:

- 1. Renewable energy resources Tiwari and Ghosal, Narosa.
- 2. Renewable Energy Technologies Ramesh & Kumar, Narosa
- 3. Non-Conventional Energy Systems K Mittal, Wheeler
- 4. Renewable energy sources and emerging technologies by D.P. Kothari, K.C. Singhal.

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Paper-II: Wind, Bio-Mass, Geothermal and Ocean Energy

UNIT I:

Wind and Bio-Mass Energy: Resources and potentials, horizontal and vertical axis windmills, performance characteristics. Principles of Bio-Conversion, Energy from waste, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, LPG and CNG.

UNIT II:

Geothermal and Ocean Energy: Resources, types of wells, methods of harnessing the energy, potential in India. OTEC, principles of utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy, Potential and conversion techniques, minihydel power plants, land and their economics.

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