

International Summer School -Manipal University Jaipur [ISSMUJ]-2024

[Hybrid Mode]



Project Overview

Name of Project- Design and Analysis of Renewable Energy System

Name of instructor: Dr. Hemant Raj Singh

Session: May-July 2024

Language of instruction: English

Number of contact hours: 36

Credit awarded: 03

Pre-requisite: Basic CAD/Modelling software

Objectives of Project

1. Design and develop mathematical model of the Renewable Energy System (Solar thermal system/Ground Source Heat Pump)
2. Simulation of developed model for varying environment.
3. Actualization of the developed Renewable Energy system.

Course Outcome: Journal Publications/ Conference/ Patent

Brief profile of the instructor

Dr. Hemant Raj Singh is working as an assistant professor at Department of Mechanical Engineering, Manipal University Jaipur, Rajasthan, India. He is B. E. in Mechanical Engineering from University of Rajasthan, India, M. Tech. and Ph.D. from the Malaviya National Institute of Technology Jaipur in the field of Energy Engineering and Solar Thermal Energy respectively. He has vast project experience of 15+ years. His research interests include renewable energy especially cogeneration and trigeneration system, energy efficiency, energy conservation audit and ventilation and air conditioning (HVAC) System. He has been instrumental in Energy Audits with Petroleum Conservation Research Association (PCRA) Jaipur in various types of industries. Along with academic responsibilities, he is associated with professional societies, e.g., *Life Member- Solar Energy Society of India (SESI)*, *Member- American Society of Mechanical Engineering (ASME)*, *Professional Member- International Solar Energy Society (ISES)*, and *Member- World Society of Sustainable Energy Technologies (WSSET)*, *ex-Member-American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)*. He is a proud delegate of the *Energy and Environmental Standards Advisory Board (EESAB)* of ASME. He has guided several B.Tech. projects and M.Tech. theses, like *UAE's village HVAC modelling* and research project in BHEL.... just to name a few. He has attended many National and International Conferences of repute and has National and International publications. He has reviewed McGraw-Hill's book titled *Nag's Powerplant Engineering*, 5th edition. Along with publications, he has also associated as a reviewer for International Journals of repute (SCI, ESCI and SCOPUS).



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Lecture Plan

S.No.	Topics/Discussion	Lecture No.
1	Selection of Renewable Energy System (Solar Thermal System/Ground Source Heat Pump)	1 & 2
2	Mathematical/Parametric Design of a Renewable Energy System	3, 4, 5, 6, 7, 8 & 9
3	Development of a numerical model of the Renewable Energy System	10, 11, 12, 13, 14 & 15
4	Simulation of the developed model of the Renewable Energy System	16, 17, 18, 19, 20 & 21
5	Simulation of the developed model for varying environments.	22, 23, 24, 25, 26 & 27
6	Discussion regarding uncertainties	28, 29 & 30
7	Actualization of the developed renewable energy system	31, 32 & 33
8	Compilation/writing/Submission	34, 35 & 36