NATIONAL INSTITUTE OF TECHNOLOGY ANDHRA PRADESH
TADEPALLIGUDEM – 534102, WEST GODAVARI DIST., ANDHRA PRADESH, INDIA.

DEPARTMENT OF MECHANICAL ENGINEERING
LECTURE PLAN (Odd Semester 2022-23)

Subject Name : Alternatie Source of Energy (Open Elective)	Code: ME390	PCC	3 – 0 – 0	3 Credits

Name of the Faculty : **Dr.Katam Ganesh Babu**
Designation : Adhoc Faculty
Department : Mechanical Engineering
Year / Semester : III/II
Branch : Mechanical

Scheme of Evaluation

Minor Test - I	10
Minor Test -II	10
Mid Semester Examination	30
End Semester Examination	50

Lecture No.	Module	Topics to be covered
1-2	Introduction to the course	Overview of the course; Examination and Evaluation patterns; Global warming, acid rains, Depletion of ozone layer; Global and Indian Scenario of renewable energy sources
3– 4	Energy Storage	Introduction; Necessity of Energy Storage; Energy Storage Methods: Thermal Energy ; Mechanical Energy; Electrical ; chemical; Electromagnetic
5– 8	Solar Energy	Fundamentals; Solar Radiation; Estimation of solar radiation on horizontal and inclined surfaces; Measurement of solar radiation
9 – 15	Solar Thermal systems	Introduction; Basics of thermodynamics and heat transfer; Flat plate collector; Evacuated Tubular Collector; Solar air collector; Solar concentrator; Solar distillation; Solar cooker; Solar refrigeration and air conditioning; Solar pond; Thermal energy storage systems
16 – 19	Solar Photovoltaic Systems	Introduction; Solar cell Fundamentals; Characteristics and classification; Solar cell: Module, panel and Array construction; Photovoltaic thermal systems
20-25	Wind Energy	Introduction; Origin and nature of winds; Wind turbine siting; Basics of fluid mechanics; Wind turbine aerodynamics; wind turbine types and their construction; Wind energy conversion systems
26-27	Fuel cells	Overview; Classification of fuel cells; Operating principles; Fuel cell thermodynamics
28-31	Other forms of Energy	Ocean Thermal Energy; Geothermal energy; Magneto hydrodynamic Power Generation applications; Origin and their types; Working principles
32-35	Seminars:	Presentations by students
	Recent Research Papers	

Reading:

1. Sukhatme S.P. and J.K.Nayak, Solar Energy - Principles of Thermal Collection and Storage, Tata McGraw Hill, New Delhi, 2008.
2. Khan B.H., Non-Conventional Energy Resources,Tata McGraw Hill, New Delhi, 2006.
3. A. Duffie and W.A. Beckman, Solar Energy - Thermal Processes, John Wiley, 2001