B.P. PODDAR INSTITUTE OF MANAGEMENT AND TECHNOLOGY
137, VIP Road, PoddarVihar, Kolkata: 7000052
Department of Electrical Engineering
LESSON PLAN

Program : Electrical Engineering Credit: 3 Contact: 3L
Course Name : Renewable & Non-conventional Energy Sources
Course Code : PE EE 501C
Course Coordinator : Sujata Saha

Lectures Number	Topics to be covered	Text Books / Reference	Teaching Pedagogies
L1	Different renewable & non-renewable energy sources merits & demerits of renewable & no-renewable energy sources	T1, R3, T3, W2	1. Lecture 2. Quiz 3. Power Point Presentation
L2	consumption of energy in the development of a Nation & the Global & national scenario of energy requirements & prospect of renewable energy	T1, R3, T3, W2	1. Lecture 2. Quiz 3. Power Point Presentation
L3	Impact of renewable energy generation on environment & the Kyoto Protocol	T1, T2, R3, W2	1. Lecture 2. Quiz 3. Power Point Presentation
L4	Solar radiation & the earth-sun relations	T1, T2, R3,W2	1. Lecture 2. Quiz 3. Power Point Presentation
L5	Solar Geometry	T1, T2, R3, W2	1. Lecture 2. Quiz 3. Power Point Presentation
L6	Solar thermal effect & different types of flat plate and concentrating solar collectors	T1, T2, R2	1. Lecture 2. Quiz 3. Power Point Presentation
L7	Different applications of solar thermal effect	T1, T2, R2	1. Lecture 2. Quiz 3. Power Point Presentation
L8	Semiconductor physics of solar cell, the photo-voltaic effect, different types of solar cell	T1, T2, R3, W4	1. Lecture 2. Quiz 3. Power Point Presentation
L9	I-V, P-V characteristics of a solar cell & explain MPPT	T1, T2, R3, W4	1. Lecture 2. Quiz 3. Power Point

			Presentation
L10	Different PV hybrid systems & their application	T1, R2, W3,W4	1. Lecture 2. Quiz 3. Power Point Presentation
L11	Different numerical problems on solar energy	T2,T3, R2, R4	1. Lecture 2. Quiz 3. Power Point Presentation
L12	Types and the distribution of wind, the principle of wind energy conversion system & its different application.	T2, R3	1. Lecture 2. Quiz 3. Power Point Presentation
L13	Basic components of WECS.	T1, T3	1. Lecture 2. Online video lectures 3. Power Point Presentation
L14	The wind mill components and their constructional features, the difference between HAWT & VAWT	T2, W3	1. Lecture 2. Online video lectures 3. Power Point Presentation
L15	Different aerodynamic forces acting on the wind mill blades,the power output from a wind mill .	T4,R2	1. Lecture 2. Online video lectures 3. Power Point Presentation
L16	Site selection considerations for a wind power plant & numerical Problems on wind energy	T1, T2, R3	1. Lecture 2. Online video lectures 3. Power Point Presentation
L17	Biomass energy and different biomass energy sources & Biomass conversion technologies.	T1, T2, R3	1. Lecture 2. Online video lectures 3. Power Point Presentation
L18	Different Biomass power plants their classification & constructional details	T3, T4,W3	1. Lecture 2. Online video lectures 3. Power Point Presentation
L19	Characteristics of bio-fuels and their uses.	T1, T4,W2	1. Lecture 2. Online video lectures 3. Power Point Presentation
L20	Design details of digester, utilization of biogas.	T1, T4,W2	1. Lecture 2. Online video lectures 3. Power Point Presentation
L21	Solve the numerical problems on biomass.	T1, W1, W2	1. Lecture 2. Online video lectures 3. Power Point Presentation

L22	Basic principles of Geothermal energy, nature of Geothermal energy	T1, T2, R3	1. Lecture 2. Online video lectures 3. Power Point Presentation
L23	Different sources of Geothermal energy	T4, R3,T1	1. Lecture 2. Online video lectures 3. Power Point Presentation
L25	the advantages disadvantages of Geothermal energy, application of Geothermal energy	W2, T4, R3	1. Lecture 2. Online video lectures 3. Power Point Presentation
L26	the prospects of Geothermal energy	T2, W4	1. Lecture 2. Online video lectures 3. Power Point Presentation
L27	different types of Geothermal Plants	T4,R3,W1	1. Lecture 2. Online video lectures 3. Power Point Presentation
L28	different OTEC systems, the prospect of OTEC systems in India.	T1, T4,R3	1. Lecture 2. Online video lectures 3. Power Point Presentation
L29	Origin & nature of Tidal energy, Basic principle of tidal power.	T1, T2,R3,	1. Lecture 2. Online video lectures 3. Power Point Presentation
L30	Basic principle of wave energy conversion systems & the power from the wave	T2, R1	1. Lecture 2. Online video lectures 3. Power Point Presentation
L31	Explain the advantages and disadvantages of wave energy.	T3, R2	1. Lecture 2. Online video lectures 3. Power Point Presentation
L32	Different Tidal Power plants	T3, R3	1. Lecture 2. Online video lectures 3. Power Point Presentation
L33	Working principle of MHD power generation	T3, R3	1. Lecture 2. Power Point Presentation
L34	Principle of MHD system design	T1, T2, R3	1. Lecture 2. Power Point Presentation
L35	Knowledge of MHD system to design a problem	T1, T2, R3	1. Lecture 2. Power Point Presentation

L36	conductivity material for MHD generators and future prospects	T1, T4, R3	1. Lecture 2. Power Point Presentation
L37	Hydrogen energy & different Hydrogen production methods	T1,T2,R3	1. Lecture 2. Power Point Presentation
L38	hydrogen storage, the hydrogen transportation	T1,T2,R3	1. Lecture 2. Power Point Presentation
L39	the utilization of hydrogen gas the use of hydrogen as alternative fuel for the vehicles	T1,T2,R3	1.Lecture 2. Power Point Presentation 3. Quiz
L 40	the introduction on Fuel cell the design principle of fuel cell	T1,T2,R3	1. Lecture 2. Power Point Presentation 3. Quiz
L 41	Types of fuel cells,	T2,T3,R2,R3	1. Lecture 2. Power Point Presentation
L 42	conversion efficiency of fuel cell, application of fuel cells	T1,T2,T3, R3	1. Lecture 2. Power Point Presentation

Text Books:

T1 Renewable energy sources and conversion technology, Bansal Keemann, Meliss, Tata Mc Graw Hill
T2. Energy Technology, O.P. Gupta, Khanna Publishing House.
T3 Renewable energy resources and emerging technologies, D.P. Kothari, PHI.
T4. Non-conventional Energy sources, G.D. Rai, Khanna Publishers.
T5. Non Conventional Energy Resources, Chandra, Khanna Publishing House.

Reference Books:

R1. Renewable energy resources and emerging technologies, D.P. Kothari, Prentice Hall of India Pvt. Ltd.
R2 Non-conventional Energy, Ashok V. Desai, New Age International Publishers Ltd.
R3. Non Conventional Energy Resources, B H Khan Mc Graw Hill Education

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Web References:

W1. https://onlinecourses.nptel.ac.in/noc23_ge47/preview

W2. https://youtu.be/iZyzvDj6Y3c

W3. https://youtu.be/cZSYukWvpsE

Referred Journal

W4. https://doi.org/10.1016/j.egyr.2024.03.007