Semester Lecture Plan

Name of the college: Government College of Arts, Science & Commerce, Sanquelim Goa

Name of Faculty: Mr. Stephen Fernandes	**Subject:** VAC	
Paper code: VAC112	**Program/Course: FYBA**	**Division: C**
Academic year: 2024- 2025	**Semester: II**	**Total Lectures: 30**

Course Objectives: 1. To demonstrate the importance of solar energy collection and storage. 2. To understand the principles of wind energy and biomass energy. 3. To gain knowledge on geothermal and ocean energy. 4. To gain knowledge on geothermal and ocean energy. 5. To understand the concepts of green manufacturing systems.

Expected Outcomes:
Students will be able to
1. Explain the importance of solar energy collection and storage
2. Apply the principles of wind energy and biomass energy.
3. Analyze knowledge on geothermal and ocean energy.
4. Learn about energy efficient systems.
5. Discuss the concepts of green manufacturing systems

Course Learning Outcome:

Month	Lectures From:	To:	No. of lectures allotted	Topic, Subtopic to be covered	Exercises/ Assignment	ICT Tools	Reference books
December	09/12/2024	14/12/2024	02	SOLAR RADIATION: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power	Explain the advantages of Renewable Energy	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources

December	16/12/2024	21/12/2024	02	Structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun	Draw the structure of the sun and co-ordinates of the earth	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
December	02/01/2025	04/01/2025	02	Extra-terrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells.	Find out the radiations reaching the planet earth List out top 5 solar plants in India	Power point presentation, White Board Youtube Videos	Khan B.H ,Non-Conventional Energy Resources
January	06/01/2025	11/01/2025	02	SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation	Working of the Solar Thermal Plants	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
January	13/01/2025	18/01/2025	02	SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney.	Applications of solar Energy	Power point presentation, White Board	Khan B.H, Non-Conventional Energy Resources
January	20/01/2025	25/01/2025	02	WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.	Discuss the impacts of wind mills on environment	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
	27/01/2025	01/02/2025	02	BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, utilization for	List out the sources of biofuels available in India	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources

				cooking			
February	03/02/2025	08/02/2025	02	Bio fuels, I.C. engine operation and economic aspects **Unit II** Geothermal And Ocean Energy, Energy Efecient Systems, And Green Manufacturing Systems	Potential of Ocean Thermal Energy in India	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
February	10/02/2025	15/02/2025	02	GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy.	Find out the ideal Locations for Geothermal Energy in India	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
	17/02/2025	22/02/2025	02	OCEAN ENERGY: OTEC, Principles of utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques.	Limitations to Ocean Thermal Energy Conversion	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
February	24/02/2025	01/03/2025	02	ELECTRICAL SYSTEMS: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation, and air conditioning), demand site management.	Energy efficient systems: Examples	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
March	01/03/2025	01/03/2025	02	(B) MECHANICAL SYSTEMS: Fuel cells- principle, thermodynamic aspects	Fuel Cell Advantages and future prospects	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
March	03/03/2025	08/03/2025	02	selection of fuels & working of various types of fuel cells, environmentally friendly and Energy efficient compressors and pumps.	Working of Fuel Cell	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources

March	10/03/2025	15/03/2025	01	Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems	Green manufacturing system: Environmental Impacts	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
March	17/03/2025	22/03/2025	02	Selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmentally friendly machining,	Environmental friendly practices	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
March	24/03/2025	29/03/2025	02	Vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.	Waste to Energy concept	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
April	31/03/2025	05/04/2025	02	Revision.		-	
April	07/04/2025	11/04/2025	02	Revision			