Semester Lecture Plan

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

Name of Faculty: Mr. Stephen Fernandes	**Subject:** VAC: Green Energy System	
Paper code: VAC112	**Program/Course: FYB. Com**	**Division: A**
Academic year: 2025- 2026	**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

Month	Lectures From:	Lectures To:	No. of lectures allotted	Topic, Subtopic to be covered	Exercises/ Assignment	ICT Tools	Reference books
December	01/12/2024	06/12/2024	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	08/12/2024	13/12/2024	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	22/12/2025	23/12/2025	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	02/01/2026	03/01/2026	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	05/01/2026	10/01/2026	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	12/01/2025	17/01/2025	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
January	19/01/2026	23/01/2026	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			
January	26/01/2026	31/01/2026	01	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	02/02/2026	07/02/2026	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
February	09/02/2026	14/02/2026	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	16/02/2026	21/02/2026	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
February	23/02/2026	28/02/2026	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	02/03/2026	07/03/2026	01	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	09/03/2026	14/03/2026	02	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	16/03/2026	21/03/2026	01	Selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient	Environmentally friendly practices	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
March	23/03/2026	28/03/2026	02	sustainable green production systems with examples like environmentally friendly machining,	Waste to Energy concept	Power point presentation, White Board	Khan B.H ,Non-Conventional Energy Resources
April	30/03/2026	04/04/2026	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	06/04/2026	10/04/2025	01	Revision			