Dr. A.P.J. ABDUL KALAM UNIVERSITY, INDORE

Course: B.Sc **Semester: I** **Session: 2022-23**

Subject: Physics (Non-Conventional Energy Sources) **Subject Code: ELPS103T**

2.	**Course Title**	**Non-Conventional Energy Sources**
3.	**Course Type (Core/Elective/Generic Elective/Vocational/...)**	Elective
4.	**Pre- requisite (If any)**	Open for all.
5.	**Course Learning Outcomes (CLO)**	At the end of the course student will be able to achieve 1. A good understanding of various non-conventional energy resources. 2. Knowledge about non- conventional energy harvesting technology. 3. The knowledge about the availability of non-conventional energy resources in India. 4. A good understanding of the solar energy and the appliances based on solar energy. 5. A non-conventional energy harvesting technical skill that will be helpful for employment.
6.	**Credit Value**	**4**

Unit	Topics	Number of Lectures
I	**Introduction to non-conventional energy sources:** 1. Classification of energy resources, Consumption trend of primary energy resources, Importance of non-conventional energy resources. 2. Energy chain, Common form of energy, Limitations of non-conventional energy resources. 3. Salient features of non-conventional energy resources, Environmental aspects of energy. 4. World energy status, Energy scenario in India. **Keywords/Tags:** Energy resources, Energy chain, Non-conventional energy.	**12**
II	**Solar energy:** 1. The sun as a source of energy, Solar radiation at the Earth's surface. 2. Photothermal applications: Solar collectors, Solar drying, Solar cooker (box type), Solar distillation, Solar water heating systems, Solar thermo-mechanical system. 3. Photovoltaic system: Photovoltaic principle, Basic photovoltaic system for power generation, Solar cells, types of solar cells, Concentrator cells, Sun-tracking systems, Limitations and environmental aspect of solar cells. 4. Photovoltaic applications: Solar Cell Panels, Solar light, Solar pump, Solar power plants, Solar cell in transportation, Solar refrigeration and air conditioning. **Keywords/Tags:** Solar radiation, Photothermal, Photovoltaic, Solar cells.	**12**
III	**Biomass Energy:** 1. Biomass resources, Biomass conversion technology, Biogas generation. 2. List of factors affecting bio-digestion, Working of biogas plant (with block diagram), Biogas from plant waste.	**12**

Part C-Learning Resources
Text Books, Reference Books, Other resources
Suggested Readings: 1. Rai G. D., "Non-conventional energy sources", Khanna Publishers, 4th edition. 2. Sukhatme S. P. and Nayak J. K., "Solar Energy: Principles of thermal collection and storage", Tata McGraw Hill Ltd., Second Edition. 3. Rai G. D., "Solar energy utilization", Khanna Publishers, 5th edition. 4. Khan B. H., "Non-conventional energy resources", McGraw Hill Publications. **Suggestive digital platforms web links** 1. https://mnre.gov.in Ministry of New and Renewable Energy