

**KABI JAGADRAM ROY GOVERNMENT GENERAL DEGREE COLLEGE,  
MEJIA, BANKURA**

**Certificate Course**

*On*

***“Non-conventional Energy Sources for Modern World”***

*Conducted by*

**Department of Physics & Department of Economics**

**(In association with IQAC)**

**Course outcome:** To understand problems of conventional energy sources; To realize necessity of non-conventional energy sources; To understand basic ideas of Solar, Wind, Geothermal, Ocean, Biomass energy etc.

**Participants:** Undergraduate students of all the Departments are welcome!

**Course duration:** 1<sup>st</sup>-11<sup>th</sup> June, 2022 (30 hours of classes)

**Resource Persons:**

1. Dr. Arijit Chatterjee (Assistant Professor of Physics)
2. Mr. Debraj Das (Assistant Professor of Economics)
3. Mr. Atanu Das (Assistant Professor of Economics)

**Grading:**

<b>Total Marks Obtained in Attendance &amp; MCQ Examination</b>	<b>Grade</b>
Above 45	A <sup>+</sup>
41 to 45	A
36 to 40	B <sup>+</sup>
30 to 35	B
Below 30	C

## Course Content

### Unit 1 2 Hrs

Energy Resources- Non- Conventional Energy Sources- Renewable and Non-Renewable energy sources.

### Unit 2: Solar energy 6 Hrs

Solar Energy, Solar Constant, Solar radiation measurements, Solar energy collector, Physical principle of the conversion of solar radiation in to heat, solar air heaters and drying, solar cookers, solar distillation, solar furnaces, solar greenhouses, solar power plants, solar photovoltaic cells

### Unit 3: Wind energy 6 Hrs

Introduction, Utilization, Advantages and Disadvantages, Environmental impact, Sources/Origins of wind, conversion and wind power, components of wind energy conversion system, Advantages and Disadvantages of WECS, Power Plant, Wind Energy Economics, Problems in operating large wind power generators.

### Unit 4: Geothermal energy 8 Hrs

Introduction, Important aspects, Structure of Earth's interior, Geothermal system- Hot Spring structure, Geothermal Resources (Hydrothermal, Geopressured, Petro-thermalsystem, Magma Resources), Advantages and disadvantages of geothermal energy over other energy forms, application of geothermal energy. Energy from biomass: Introduction to biomass, Biomass resource, Biomass Conversion process; Biogas Applications, Biogas Plants.

### Unit 5: Energy from Oceans and Thermal and Chemical effects 8 Hrs

Ocean Energy, Ocean Energy Sources, Tidal energy, Components of a Tidal Power Plant, Economic aspects of tidal energy conversion, Wave energy, Advantages and disadvantages, Factors affecting Wave energy, Ocean Thermal Energy Conversion (OTEC), Working principle of OTEC, Types of OTEC, Advantages and Disadvantages and Applications of OTEC. Thermo-electric effects, Fuel Cells, Hydrogen energy, Nuclear Reactors, Advantages and Disadvantages of Nuclear power plants (Basic Principles/concepts only)

## Other Details of the Course

Pedagogy	:	Chalk and Talk
Course Fee	:	Nil
Intake Capacity	:	30
Assessment Process / Evaluation Modalities	:	Attendance (10) and Examination (40) through MCQ
Rules and Regulations	:	1. Scheduled written examination must be submitted. 2. Students must attend 60% of the classes

