



GREEN ENERGY FOR SUSTAINABLE FUTURE

An add-on course offered by
Department of Physics, Garhbeta College
(Through blended mode)

Objectives

This course is designed to make students aware of following:

- Lowering carbon emission, greenhouse gases, global warming in order to protect mother nature
- Utilization of abundant natural energy resources to reduce dependency on fossil fuels
- Latest technologies used to harness green energy from nature
- Business opportunities

Facilitator



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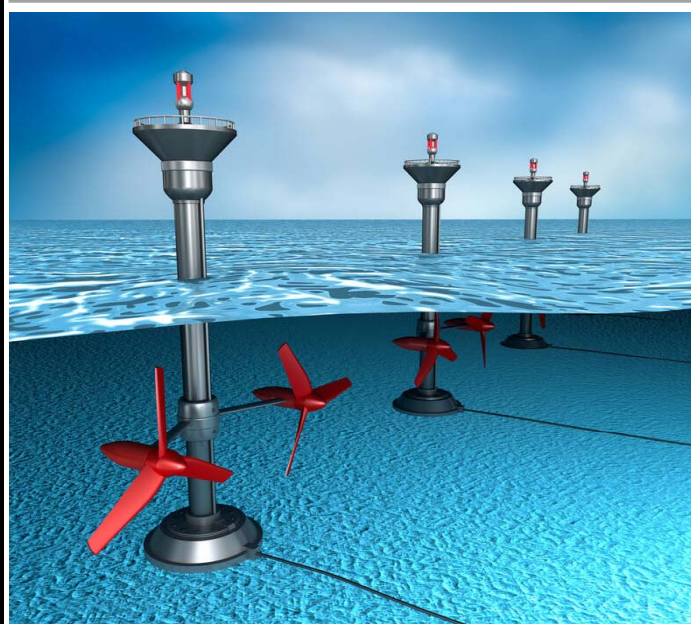


Course outline

- ❑ India's current energy scenario, drawbacks of fossil fuels, need for green energy (2 hrs)
- ❑ Photovoltaic technology (2 hrs)
- ❑ Organic and perovskite solar cells (2 hrs)
- ❑ Solar thermal devices (2 hrs)
- ❑ Various types of wind turbines and grid interconnections (2 hrs)
- ❑ Marine power: wave energy devices, tidal and osmotic power, OTEC technology (2 hrs)
- ❑ Hydroelectricity, formation of dams, rain water harvesting (2 hrs)
- ❑ Biomass energy: utilization of agricultural, animal and industrial wastes (2 hrs)

Background

The modern civilization is dependent upon energy more than ever in the past. Starting from a small cell phone to large scale industries, all are driven by energy. The demand for energy by modern human civilization is increasing rapidly with the establishment of new metropolitan cities and large scale industries all over the world. But today's main energy sources (fossil fuels) are finite and long-term effects of their use is detrimental for the environment. This enforces us to look for 'green energy' sources, such as sunlight, wind, tides, rain, waves, geothermal heat, bio-mass and bio-fuel.



Course outline continues

- ❑ Geo-thermal power, hot springs (2 hrs)
- ❑ Piezoelectric, electromagnetic and nuclear energy: environmental impact (2 hrs)
- ❑ Our responsibility to build a sustainable future and conclusion (2 hrs)

Hands-on experiments:

- ❑ Generating thermo-electricity from temperature difference of water (2 hrs)
- ❑ Operating small fans, buzz, LEDs using solar cells (2 hrs)
- ❑ Variation of solar power with light intensity, shielding, and wavelength (2 hrs)
- ❑ Calculation of V_{oc} , J_{sc} , FF and efficiency of solar cell from I-V characterization (2 hrs)