ST ALOYSIUS DEEMED TO BE UNIVERSITY

Mangaluru

SCHOOL OF VOCATIONAL COURSES

DEPARTMENT OF B.VOC IN RENEWABLE ENERGY MANAGEMENT OFFERS

SKILL ENHANCEMENT COURSE

RENEWABLE ENERGY AND ENERGY HARVESTING
Draft Syllabus- Skill Enhancement Course

Fundamentals of Solar Energy Cells and PV Modules:
Solar radiation - Solar Spectrum, Solar Radiation at a Given Location, Annual Variation in Solar Radiation, Optimal Tilt for Solar Equipment, Domestic and commercial solar thermal applications, solar collectors, heat exchangers, solar steam generators, solar dryers and furnaces.

Theory of p n junction, Principle of operation of p-n junction Solar Cell, I-V Characteristics Status of Photovoltaic Technologies, Solar cell types, Solar Cell parameters, Efficiency of solar cells and PV modules, Types of modules, Characteristic I-V curves for modules, Irradiance dependence and temperature characteristics.

Basic Electricity and Hydro Power
Hydropower plant - Selection of Site - Classification layout governing turbines - Gas turbine power plants - Performance enhancement techniques, equipment. combined cycle power plants, integrated gasification combined cycle, cogeneration plant - Equipment and performance.

Domestic and commercial electrical wiring, switch gears, Sizing, tracking, Power cables, electrical network design, Estimation of Energy Production and transmission, Applications of on-grid and off-grid and Hybrid Power, and Stand-Alone system.

Biofuel & **Wind Energy**
Liquid biofuel: Biodiesel – the mechanism of transesterification, fuel characteristics of biodiesel, technical aspects of biodiesel engine utilization, Alcohol production from biomass, Combustion in excess oxygen and oxygen deficient atmosphere. Pyrolysis, Carbonization, Biomass gasification-different types-power generation from gasification.

Introduction to wind energy, Wind Resources, Wind Shear, Wind Maps, Wind Turbines, Small Wind Turbines, Village Power and Wind Diesel. Energy plantation - Overview of

energy plantation. Wasteland utilization through energy plantation, Biomass-based power generation, Large Scale Wind Farms

Practicals:

1. Construct and study a solar drying system model
2. Thermocouple – Seebeck effect (To verify the relation between thermo emf of a thermocouple and temperature difference between two hot junctions)
3. Determination of Specific heat capacity of water by heating coil method.
4. LDR characteristics.
5. Estimation of specific heat of biodiesel.
6. Characteristics of Photodiodes
7. Study of solar lighting using solar panel
8. Study of voltage versus distance curve of a solar cell
9. Study of the effect of filters on the voltage of a solar cell
10. Kinetic energy and velocity of a fluid using pressure head
11. Determination of Reynold's number
12. Determination of surface tension of a liquid by capillary rise method.
13.

Text Books

Sl No	Title of the Book	Authors Name	Publisher	Year of Publication
1	Introduction to renewable Energy (energy and the environment series)	Vaughn Nelson	CRC Press Taylor & Francis Group	2011
2	University Physics with Modern Physics	Hugh D. Young, Freedman Roger A.	14th Edition | By Pearson	

References Books

Sl No	Title of the Book	Authors Name	Publisher	Year of Publication
1	Alternative Energy Systems and Applications	B. K. Hodge	Hoboken, NJ: John Wiley & Sons	2017
2	Fundamentals and Applications of Renewable Energy	Mehmet Kanoglu, Yunus Cengel, John Cimbala	McGraw-Hill Education	2020
3	Renewable Energy Resources	John Twidell and Tony Weir	Taylor & Francis	2006
4	Understanding Renewable Energy Systems	Volker Quaschning	Earthscan (science publishers)	2005

5	Wind Energy Engineering, A Handbook for Onshore and Offshore Wind Turbines		Academic Press	2017
6	Solar energy: The physics and engineering of photovoltaic conversion, technologies and systems	Arno HM Smets, Klaus Jäger,Olindo Isabella, René ACMM van Swaaij Miro Zeman	UIT cambridge	2015
7	Fundamentals of Renewable Energy Processes	Aldo Vieira da Rosa, Juan Carlos Ordonez	Academic Press	2021
8	non-conventional energy resources	G. S. Sawhney	Phi learning private limited	2012
9	Non-conventional Energy Sources	G. D. Rai	Khanna Publishers	2001