## E2

## King Saud University

## Electrical Engineering Department

## EE 496 - Senior Design Project 1 (Multi-Disciplinary Design Project in collaboration with Mechanical Engineering Department)

**Project Title**

**Design of photovoltaic panel cooling system for solar house for SDME**

**Supervisors:**

**Dr. Mohamed Abbas - EE Department**

**Dr. Jamel Orfi - ME Department**

**Dr.** Zakariya Kaneesamkandi **- ME Department**

**Introduction**

Efficiency of photovoltaic (PV) system is reduced as the temperature of PV panels increases. A cooling system is proposed using water as the cooling fluid for solar photovoltaic panels. Cold water is produced and stored using the photovoltaic panel itself using night sky radiation and convection cooling. A group of students in Mechanical and Electrical will work jointly on this project.

Electrical part

The project involves a control system for operating the cooling water pumps and for sensing the panel temperature. The electrical output of the panel will be stored in battery.

Mechanical Part

The project will focus on the quantity of water required, tank sizing, piping, heat exchange surfaces and electrical controls.

**Objectives**

To design the PV panel cooling system including the piping and storage system (1st semester)

To design the charging system of the batteries (1st semester)

To build and test the cooling system and PV output power under real conditions (2st semester)

To monitor and control the PV system including the cooling system (2st semester)

**Assumptions,** **Design Constraints & Specifications**

The system will be initially tested using a test scale model of 100-200 W capacity. The full system with several PV panels should have a power output of 5 kW.

The conditions prevailing in Riyadh during summer months will be used for the design.

The system should be compact and energy efficient.

**Outcomes and expected Deliverables**

An efficient operation of PV panel is achieved through this design.

**Phases and Tasks**

Semester 1- Literature collection, design

Semester 2- Construction and testing

Number of students-3 (Mechanical) and 3 (Electrical )

Methodology / approach to be used in the work: experimental

**Time table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Month 1** | **Month 2** | **Month 3** |  |
| **Semester 1** | **Literature** | **Design** | **Report** |  |
|  |  |  |  |  |
| **Semester 2** | **Manufacture** | **Testing** | **Report** |  |
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