UNC CHARLOTTE
The WILLIAM STATES LEE COLLEGE *of* ENGINEERING

Senior Design Project Description for FALL 2016

Project Title: Rooftop Photovoltaic Array Design for Parking Deck (FM_SOLARPD)

Supporter: Facilities Management

Supporter Technical Representative: ASSIGNED

Faculty Mentor: _____ ASSIGNED __X__ TBD (check one)

Single Team __X__ Dual Team _____ (check one)

Personnel (EN/ET): __2__ E, _____ Cp, _____ Cv, __3__ M, _____ SE

(Complete if the number of students required is known)

Expected person-hours: (250 per student)

Description of Project:

The UNC Charlotte campus has several recently-built parking decks that extend above surrounding trees providing potential for the addition of solar photovoltaic (PV) electricity production. The buildings also maintain a baseload for lighting and other systems. The challenges with this project include integration with the building electrical system, but also a substantial challenge for PV panel mounting systems that will maintain the parking capacity while working within critical criteria (e.g. weight-bearing limits, theft-security, attachment to the structure, etc.). This project would develop the design for a PV system to fit the roof of the CRI Deck, and address the potential for a common design across several modern decks including South Deck, North Deck, and Student Union Deck. The PV system would be designed to feed a portion of the base electrical load of the building. This project is to develop a preliminary design including cost estimate for this solar PV system.

Initial Project Requirements (e.g. weight, size, etc.):

The requirements for this project are:

1. Determine electrical load for the buildings
2. Research NREL for insolation data
3. Investigate panel mounting systems that accommodate vehicle parking
4. Verify building conditions and limitations to accommodate the PV equipment
5. Develop cost estimate for system installation and determine payback period

Close association with Facilities Management (FM) personnel will be required throughout the project for assistance with building information.

Expected Deliverables/Results:

A complete report is required. This report will include:

1. Solar panel arrangement drawings
2. Circuit drawings
3. Wiring routing drawings

4. Control drawings
5. Mounting hardware drawings
6. Cost analysis

List here any specific skills or knowledge needed or suggested (If none please state none):

Circuit design and power systems
Structural design