UNC CHARLOTTE
The WILLIAM STATES LEE COLLEGE *of* ENGINEERING

Senior Design Project Description for FALL 2016
Project Title: Solar Study at Regional Utility Plants (FM_SOLRUPS)

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 campus has made limited use of solar power for heat, most recently on the South Village Dining Hall to heat water for dishwashing. But solar thermal energy can be used for many other purposes, including hot water showers, heated swimming pools, pre-heating for steam/water heating plants, radiant hydronic heating, and even cooling with absorption chillers. A study is requested to identify the potential uses of solar thermal energy at Regional Utility Plant (RUP) on campus. The campus has multiple RUPS, so the preliminary analysis will compare these facilities as solar harvesting sites (e.g. rooftops, yards, adjacent land). Based on this preliminary study, a specific project will be selected for a design that can be integrated into an existing campus RUP.

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

The requirements for this project are:

1. Determine solar harvesting sites for RUP facilities (location, size).
2. Research NREL for insolation data
3. Investigate heat use in a RUP to determine potential size of solar thermal system
4. Specify mounting systems that fit facility spaces and structures
5. Verify building conditions to integrate solar thermal equipment for fluid circulation and heat transfer.
6. 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