Senior Design Project Description for SPRING 2016
Project Title: Self Charging Electric Vehicle (ELEC_VEH)

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, __2__ M, _____ SE (Each team)

(Complete if the number of students required is known)

Expected person-hours: (250 per student)

Description of Project:

UNC Charlotte has the largest fleet of electric vehicles in the state, with approximately 150 in use. The most common models are GEM's, which are recharged using 110-volt electrical lines, but these service vehicles often spend the day away from charging points. Facilities Management would like to explore options for equipping their electric vehicles with photovoltaic (PV) cells to boost the range and reduce purchased electricity.

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

This project will retrofit a university-provided GEM electric vehicle for self-charging with PV technology. Factors to consider in the design and retrofit include:

1. Retaining plug charge capability
2. Scaling the PV array to the battery-charging system and available roof surface
3. Monitoring and metering, including possible integration with VEEBAR system
4. Performance modeling and expected energy yield
5. Mounting hardware and weatherproofing
6. Safety considerations for drivers, passengers and mechanics
7. Capital and operating costs

Facilities Management will provide one GEM vehicle for conversion when the team has reached the 90% design phase. They will make GEM vehicles available as needed for the design team to gather data or test components. Facilities Management may also be able to provide subsystems from a GEM for lab development of the photovoltaic system.

Expected Deliverables/Results:

The deliverable will be one converted GEM vehicle with the PV-charging and plug-charging capability. The results of the project will also be summarized in a report. This report will include design diagrams, parts lists, instructions sufficient for future retrofitting of GEM vehicles, and post-retrofit performance data. Cost estimates will be based on commercially available parts, but can also inform the University of other Options, such as use of PV cells produced in university labs.

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

None