# Appendix A: Breadth Topics

## Breadth Topics

To satisfy all ABET accreditations and fulfill the Architectural Engineering Department's senior thesis requirements, the following breadths not within the Construction Management curriculum will be explored. These breadths will establish that that I am proficient in other areas than simply Construction Management.

## Structural/Architectural Breadth: *Contributes to Technical Analysis 3*

~~The value engineering of façade in this analysis will lead to either precast panels being installed where metal panels once used to be or metal panels taking the place of the where precast panels were originally designed for. Either way there will be significant alterations to the structural load that the building will have to carry. Beams, girders, and columns that once carried the old load will now have to be re-examined and possibly redesigned to ensure that they can carry the new load. After completing the value engineering analysis and selecting the replacement facade, the new design parameters will first have to be determined. After new parameters have been established the new loads can then be calculated.~~

The value engineering of the roof systems in this analysis will lead to completely different loads carried by the steel beams and columns. The standard roof will be lighter than the original Green Roofs. However, with the addition of PV panels and supporting equipment the loads will increase in certain areas of the building. Beams, girders, and columns that once carried the old load will now have to be re-examined and possibly redesigned to ensure that they can carry the new load. After completing the value engineering analysis and selecting the replacement roof system, the new design parameters will first have to be determined. After new parameters have been established the new loads can then be calculated.

Because the appearance of the building is being altered a brief architectural breadth will also have to be performed to ensure that the function and overall aesthetics of the building are intact. In addition, Green Roofs critical to patient views will have to be considered.

## Renewable Energy/Electrical Breadth: *Contributes to Technical Analysis 3*

~~Whenever materials are altered in a building's façade, there is a good chance that there will be a significant impact to the thermal conductance. Altering the thermal conductance of a hospital can be a dangerous game. Hospitals are sensitive places that cannot afford the temperature of certain areas to be fluctuating. In this analysis all thermal conductivity changes due to the replacement system will be calculated. In addition to this analysis, it will also be imperative to calculate the heating and cooling loads before and after the change to ensure that the owner is being delivered a quality product.~~

The power distribution system for the Susquehanna Health Patient Tower Expansion is a 3-phase 480Y/277 4-wire 15KV feed that runs off of a 12.7 KV transformer. In addition, the entire expansion as well as the existing hospital will be backed up by two diesel powered generators located in the central utility plant.

To decrease the operational costs over the life-cycle of the building, PV panels will be implemented to harness the solar radiation to produce electricity and decrease the energy needs of the building. Electrical equipment in the original design will have to be altered to facilitate the new PV panels and their supporting equipment.  Tie-in locations will have to be established and may have run back to the central Utility Plant.

After all data on the electrical requirements of the PV system have been calculated a constructability review will have to be done to ensure that the systems are compatible. In the event that they are not compatible, a suitable system will be provided.

# Appendix B: Spring Semester Preliminary Timetable