Executive Summary

The Frederick College of cardiology is a well-designed building incorporating several different functions into one facility. The lighting designs of four spaces have been redesigned to adhere to a new conceptual idea which reflects the occupants goals for the use of the building. The College focuses on learning about the human body and how to heal it. Ideas about the body and how it works were implemented into the lighting designs. The new auditorium space uses a deconstructed ceiling and ambient lighting to convey a sense of separateness reflecting how parts of the body are separate but work together. The lobby area has a color changing feature wall which displays all of the colors that make up white light. The office uses a series of drop ceiling panels and exposed structure to show off the bones of the building and further promote the idea of how the separate parts of architecture work together. The exterior lighting reveals both the inside and outside of the building. (The conceptual lighting design is described in more detail in the lighting depth section of the report.)

In addition to redesigning the lighting, a daylighting study was conducted to design suitable shading systems for the lobby and open office space. The shades sought to provide a comfortable environment that was glare free but also well lit by natural light. A shade with 2-3% openness factor with a dark color was selected to maximize outdoor views. The final results determined suitable shade photo sensor settings to use to have the shades only activate when desired.

The electrical system was analyzed and revised appropriately to accept new lighting loads. 7 panel boards and feeders were recalculated and redesigned. An aluminum vs. copper feeder study was conducted which showed that using aluminum feeders in certain cases could save the college over 11,000$.

The new ceiling design in the auditorium solicited an acoustics analysis. This analysis determined that an acoustic plaster would be necessary to use on the redesigned ceiling to keep the reverberation time in a suitable range for speech. The finished design displayed a T60 reverb time between .5 to .8 seconds for occupied and unoccupied rooms respectively.

The lobby's large windows prompted an energy analysis which would compare the return on investment of different glazing types to identify a suitable specification. The analysis showed that a more expensive glass would be beneficial in the long run as it would save about 3000 dollars per year in energy cost.

In total, this thesis report covers six topics which represent the depths and breadths of the knowledge I have gained at PSU studying in the AE program.