



## ***Breadth Topics***

The following topics involve a more detailed analysis in distinct technical disciplines within the major of Architectural Engineering at The Pennsylvania State University. Each topic contributes to one of the previously mentioned analyses.

**Structural Breadth:** Contributes to Technical Analysis #1, Technical Analysis #3, and Technical Analysis #4

The current roof and floor of New York Police Academy's Physical Plant is metal decking atop 30' spans for the flooring and 120' spans on top cellular and castellated beams, respectively. The remaining superstructure is consisted of structural steel, concrete matt slabs, and pile cap systems.

The replacement of the castellated and cellular beams within the Central Utility Plant, as proposed in Technical Analysis #1, will be analyzed to determine the overall effects upon the existing structure. As proposed in Technical Analysis #3 and Technical Analysis #4, the general façade will be altered either with the additional of a photovoltaic energy system or replacement of the precast concrete panel system with a metal panel system; these two analyses will require a structural analysis to determine the loading and support requirements of the system. Any additional support and connections that are required for the beam replacement, precast concrete panel system replacement, and addition of the photovoltaic energy system will be evaluated for a cost and schedule impact on the overall project.

## **Electrical Breadth**

The power distribution system for the Academics/Administration building consists of a primary switchboard rated at 3000 Amps, 460 V, 3 Phase and a secondary rated at 2500 Amps, 460 V, 3 Phase switchboard; the Central Utility Plant uses two (2) 4000 Amps, 460 V, 3 Phase switchboards.

Integration of a photovoltaic energy system into the existing energy system will be analyzed to determine any additional electrical and connection requirements. Upon understanding the overall loading of the building, proper calculations will be used to determine the overall performance of the photovoltaic energy system to reduce the total electrical usage drawn from the utility power grid.