Objective
The purpose of this IPRO is to design a 22 story hotel located in the western suburbs of Oakbrook, IL. The group will use their skills in Architectural, Structural, and Mechanical engineering to efficiently design this structure.

Deliverable
Applied knowledge gained through prior coursework to design the large structure according to AISC, IBC, and ASCE-7 code. Additionally, we designed the building for sustainability.

Major Ideas Incorporated Into Design

Architectural
- Kitchen and formal restaurant
- Exercise room and spa area
- One floor for hotel administrative offices
- Green roof and outdoor area at the top floor
- Ballroom

Structural
- Concrete spread footings and caissons for the foundation
- Reinforced concrete shear walls forming the core of the building, designed to resist gravity and lateral loads imposed on the structure
- Steel columns and composite steel beams designed to resist multiple loads

Mechanical
- Heating Ventilation and Air Conditioning
- Mechanical Electrical and Plumbing systems
- Electrical equipment and accessories

Civil Engineering
Corina Abrudan
Christopher Adams
Kaitlyn Conley
Brian Crowley
Carl Ekstrand
Joseph Jurastis
Karolis Kozys
Rotislav Kucher
Luca Lollino
Adam Nizich
Fabian Aguilar
Benjamin O’Neil
Andrew Witek

Mechanical Engineering
Rodrigo Aihara
Algirdas Bielskus
Adnan Bhat
Jesus Cervantes
Kwong Cheung
Garrett Ezell
Gustavo Zarazua

Architecture
Adam Newman
Shin Young Park
Sacha Roubeni

Acknowledgements
Professor Jeffrey Budiman
Professor Jie-Hua Shen
Assistant Jorge Cobo
**Deliverables**
- Detailed floor plans and wall sections
- Floor by floor layout to accommodate a broad range of needs in the community
- Physical model of the structure in its entirety
- Sustainable green roof

**Challenges**
- Difficult to design without exact site location
- Designing layout based on the given footprint of the structural frame

**Deliverables**
- HVAC design for sustainability, ductwork routing
- Plumbing and electrical routing design
- Mechanical room design around shear walls

**Challenges**
- Utilization of available space efficiently in order to fit necessary equipment
- Selection of appropriate equipment in order to meet building load requirements based on equipment efficiency and footprint
- Incorporating energy recovery where possible

**Deliverables**
- Analysis of all load cases, including dead, live, wind, and seismic loading
- Main steel members of the structure such as beams, columns, and girders
- Working Finite Element Model of the structure of the hotel including all of the load combinations in accordance with the IBC code for the purpose of analysis

**Challenges**
- Over 20 possible load cases, narrowed to 7 general cases used in analysis
- Adjusting models to accommodate deviations from original plan