IPRO It takes a team INTERPROFESSIONAL PROJECTS PROGRAM

IPRO-315: Fall 2009
Design of a Large Scale Structure

IPRO Faculty Advisors

Dr. Jay Shen
Jorge Cobo

IPRO Team Member

Carmen Aguilar-Wedge
Oladipo Animashaun
Alex Baur
Michael Cullen
Shuaib Hadi
Namrata Hedge
Steve Kuo
Christopher Lee
Yongdoo Lee
Karol Rybaltowski
Dawveed Scully
Jie-Hua Shen
Shadi Yousef

September 10, 2009

1.0 Team Information

Name	Major	New knowledge/ skills to develop	Strengths	Overall expectations
Carmen Aguilar-Wedge	Civil Engineering	Interested how to manage engineers and architects together as well as investigating structural computer 3D modeling.	Organized. Work well with others.	I expect to clean up any mistakes that were made in previous semesters, and create a realistic hotel while working with others.
Oladipo Animashaun	Architecture	Leadership skills	AutoCAD, 3ds Max, Adobe Illustrator, Adobe Photoshop, Model making, Experienced team member of an architecture firm	Good efficient building.
Alex Baur	Civil Engineering	Want to learn how a project comes to the form of the final presentation to the client.	Strong AutoCAD skills and several summers of internship in engineering firm.	Want to complete the design in a practical and economic manner.
Shuaib A Hadi	Civil/Structural Engineering	Develop Design Engineering Skills.	Hardworking individual, team player and focused to accomplish set goals.	Expand on my Design Engineering experience and get a better understanding of Industry practices.
Michael Cullen	Architecture	Develop my presentation skills and learn how to work in a large group with Architects and Engineers	Auto Cad, Adobe, and hotel development.	I expect our group to learn how to collaborate between the architects and engineers to solve the problem at hand and to work efficiently and effectively.
Namrata Hedge	Architecture Structural engineering	Learn about working both with architecture and engineering group and see how I can apply my academics to the real world. Since I am minoring in structural engineering it will also help me learn about working as a structural engineer and explore other options in designing.	Team Player, Know AutoCAD , 3dsmax,photoshop. Can coordinate with both architecture and engineering group ,Work well with a large group and coordinate	I hope to be able to work with both the architecture and structural engineering group
Steve Kuo	Architecture	Better Understanding of the Structure Design	Team Player	Finish the tasks on time and have a good project to present.
Christopher Lee	Civil Engineering	Computer Modeling, learning efficient methods of design.	Time Management, Leadership, Prior experiences in construction and design.	Gaining hands-on experience of a design project based on the technical information learned from the past 3 years.
Yongdoo Lee	Civil Engineering	Improve my team work	Hardworking, good with structural analysis calculations	To get close to real work experience.
Karol Rybaltowski	Civil Engineering	Strengthen structural skills, team-based work	Organizational skills, hard-working, AutoCAD experience	To work effectively within the team to develop a working design
Dawveed Scully	Architecture	Work on team skills and practice detailing.	Knowledge of architectural detailing and systems, 3d modeling and rendering, graphic presentation, works well with teams.	To gain more knowledge on how the other fields work and practice detailing.
Shadi Yousef	Electrical Engineering	Work efficiently in a large group to complete a real-life project	Motivated, hardworking, and good problem solving skill	Expect to learn and gain experience in teamwork skills in solving problems and taking on a real-life project and completing it.
Youjee Kim	Architecture	Develop collaboration skill and presentation skill in large group	Auto CAD,Adobe,3D MAX,VIZ	I expect that everyone works together effectively to get successful design.
Karl Rybaltowski	Civil Engineer/ Political Science	Strengthen structural skills, team-based work	Organizational skills, hard-working, AutoCAD experience	To work effectively within the team to develop a working design

2.0 Team Purpose and Objectives

Located in Oakbrook, IL the architects and engineers of IPRO 315 will design a 22 story hotel. Together architects and engineers will modify and re analyze a structure created by pervious designers, and select any new materials for construction. In creating the hotel students will be responsible for the structural analysis of columns, beams, foundation, steel, and concrete design required to insure all serviceability requirements. The students will be required to follow the 2006 International Building Code, and secure the safety of all possible occupants. Management, leadership, ethics, and teamwork will be an integral part of building a large scale structure as students learn to work together on a "real life" project.

3.0 Background

3.1 Sponsor Information: IPRO 315 Design Group is a multidisciplinary design firm specialized in residential and hotel building projects. IPRO 315 Design Group is composed of two main divisions: Architectural and Structural. IPRO 315 Design Group is divided in two groups forming each of the divisions of the company.

3.2 Addressed Problems: In the spring 2009 Ipro 315 created a preliminary design and after analysis it was found to be structurally inadequate. The 22 story hotel will be re-designed and analyzed. IPRO 315 is focusing on getting design project documents done for bid purposes by completing them in accordance with the 2006 International Building Code IBC-2006 and other relevant code references as required by the city of Oakbrook.

3.3. Technology Involved: SAP (Structural Analysis Program) will be used to analyze the integrity and strength of the structure. MathCAD will assist in any hand calculations that need to be done. AutoCAD is also utilized to draw out all elements of the structure, which include architectural and structural components. Technical report writing is used to effectively explain the results of the project.

3.4. Previous Attempts to Solve the Problem: The first attempt by the spring 2009 IPRO 315 was unsuccessful in meeting all the structural requirements of the design. Specifically the building's concrete core failed to account for torsion control. This will be the second semester for IPRO 315.

3.5. Ethical Issues: IPRO 315 will use the International Building Code, ASCE 7-05, as well as all codes required by the city of Oakbrook in our design. The use of these codes will ensure safety for all that intend to use the building.

3.6. Societal Costs: IPRO 315's design will be the structural and architectural shell for possible for an environmentally friendly mechanical and electrical

system. From a structural point of view we will use recycled materials, i.e. steel & concrete. This hotel will also help society by providing the potential to create jobs in this rough economic period.

3.7. Implementation Outline: IPRO 315 has been split into an Architectural and Structural team. Both groups will work together under 2 leaders to meet deadlines.

3.8. Research literature: Research from educational textbooks, literature, and journals pertaining to strength of materials, and other relevant design information available will be used. Each team will consult with experts in the fields when needed.

3.9. Supporting Documents: A document provided to us from our preliminary briefing for the project is attached as Addenda A.

4.0. Team Values Statement

This semester's IPRO - 315 team recognizes that the success of the project, and the individual's capacity for learning, rests on the fluidity of the group's dynamics. Therefore, the team collectively will adhere to certain values that would support successful projects in business environment. These 'ethically tolerated' values include, but are not limited to the following:

4.1 Meet code standards.
4.2 Regular attendance and punctuality to group and sub-group meetings.
4.3 Participation and contributions to group discussions and sub-group objectives.
4.4 Close attention to the timeline of objectives set forth in the Project Plan.
4.5 Clear and timely communication with team member's regarding project objectives, including IPRO Deliverables.

The above values will be regimented by the sub-group leaders; should group members disregard the values, the advisors will be notified. These objectives will be made more fluent through iGroups online discussions and detailed online time reporting, regular sub-group meetings, clearly defined sub-group goals, and frequent communications between sub-group leaders.

4.0. Methodology / Brainstorm / Work Breakdown Structure

5.0. Methodology / Brainstorm / Work Breakdown Structure

The IPRO team will develop the architectural and engineering design for an engineer's estimate concerning the development of a mid-rise hotel in Oakbrook, Illinois per the request of the sponsor. The breakdown of work is as follows.

5.1 This is an inter-disciplinary team and the work breakdown will affix the major design groups required in the design of the building. Group members will be mentioned in a subsequent section, but the groups are defined as follows:
5.1.1 Architecture Group – Involved in the design of the building, including frame, layout, aesthetic design, et al. The group will also be responsible for the building models, code accommodation, and green roof design.
5.1.2 Structural Group – The group will be responsible for the structural design, engineering related computer modeling, relevant code compliance, and foundation design.
5.2 Relevant models will b e constructed in various software. Models will be developed and presented to all teams, to assure compliance with engineering procedure and code.
5.3 Required analyses will be documented within each group, to be held accountable by the group leader, and posted on iGroups to ensure transparency of results.
5.4 The order of work breakdown, and expected task completion which corresponds to required development will be defined in section 8.0.
5.5 IPRO deliverables are the responsibility of the deliverables team, who will assign tasks to others as necessary, but have the overall liability in constructing the deliverables. Other members are responsible in accordance with the team values mentioned in section 4.0.

6.0. Expected Results

This project will give the IPRO team an opportunity to incorporate the materials that have learned through out the course of their education giving them an opportunity to apply their studies on actual design procedures and processes. The individuals involved will be able to work as a team in order to determine the solutions to the design of a large scale project and attain the skills necessary to prepare them for the following steps of their professional careers.

6.1 The team will need to work together on the design of a 22 story hotel in Oakbrook, IL and will need to coordinate with other members of their groups in order to accomplish the overall design and make sure that this project is constructible..

6.2 The team will be producing various design and structural drawings representative of the project and operation of the building.

6.2.1 Architectural drawings will provide the general details of the building design and function.

6.2.2 Structural drawings will provide the support structure of the building.

6.3 The team will expect to face challenges over the design of such a large scale project and will be expected to solve each of those challenges.

6.3.1 The Architectural group will need to overcome challenges based on the previous design given and make it superior and finely tune any mistakes. They must create assembly details of the building and make sure that the building fulfills the client's needs.

6.3.2 The Structural group will need to overcome challenges based on the previous design and figure out and solve why the previous design was unsuccessful. They will need to make recalculations for the load conditions and make changes to the design in order to properly support the structure.

7.0 Project Budget

Presentation:	Total Estimate:	$100
Posters		
Printing		
Misc. Supplies		
Model:	Total Estimate:	$300
Construction Supplies		
Glue/Nails		
Miscellaneous	Total Estimate:	$100
	Total:	$500

8.0. Schedule of Tasks and Milestone Events

The following schedule of tasks reflects the required, yet ideal sequence in designing the structure, as certain groups must complete tasks for other groups to continue in the development of the building.

Milestone Dates	Architecture				Engineering					IPRO DELIVERABLES
	Plans	Sectional	Elevations	Details	Computer Modeling	Concrete Core	Steel Framing	Foundations	Scheduling	
9/11/2009	PROJECT PLAN DUE									
9/15/2009	Brainstorm conceptual design and framing				Begin SAP modeling; Research load combinations and building codes			Research foundation sites		
9/22/2009	Floor programming and layout				Confer with ARCH group about designs for the CAD; Finish SAP Model (frame) model	Begin CAD modeling	Begin CAD modeling	X		
9/29/2009		Framing, programming, and layout finalized	X		Revise model per group requests	Apply load cases to the first floor	Apply load cases to the first floor	X		Create Midterm Presentation
10/5/2009	MIDTERM PRESENTATION									
10/6/2009		X	X		Revise model per group requests	Continue Calculations	Continue Calculations	X		
10/23/2009		X	X		Revise model per group requests	Continue Calculations	Continue Calculations	X		
10/20/2009		X	X		SAP Model finalized	CAD Model finalized, Calculations Checked	CAD Model finalized, Calculations Checked	X		
10/27/2009				X				X	Look at CAD files and start schedule of construction	
11/3/2009				Incorporate further aesthetic appeal and ornamentation				X	X	
11/10/2009				X				Foundation/Earth work calculations finalized	Finish schedule of construction	
11/17/2009										Create Final Project Draft
11/20/2009	FINAL PROJECT REPORT DRAFT DUE									
11/24/2009										Create Abstract, Brochure, &Poster
11/30/2009	ABSTRACT/BROCHURE/POSTER DUE									
12/1/2009										Prepare for IPRO Day.
12/2/2009	FINAL PRESENTATION DUE									
12/4/2009	IPRO DAY/FINAL PROJECT REPORT DUE									

9.0 Individual Team Member Assignments

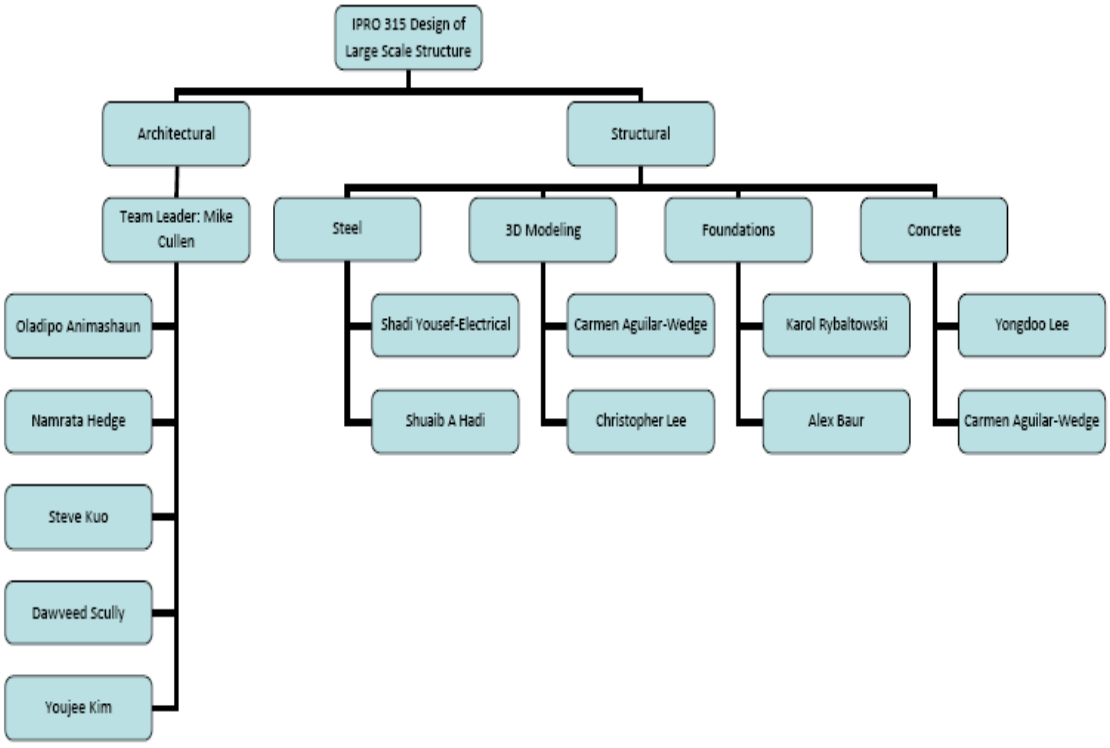
9.1 Architectural Group

9.1.1 Conceptual building design
9.1.2 Building programming
9.1.3 Floor Schematics for typical sections
9.1.4 Integration of sustainable design
9.1.5 Models & display

9.2 Structural Group

9.2.1 Administrative
  9.2.1.1 IPRO Deliverables
  9.2.1.2 Structural group oversight
  9.2.1.3 Communications
9.2.2 Load Analyses
9.2.3 CAD Drafting
9.2.4 SAP Modeling
9.2.5 Foundation Design

9.3 Team Schematic

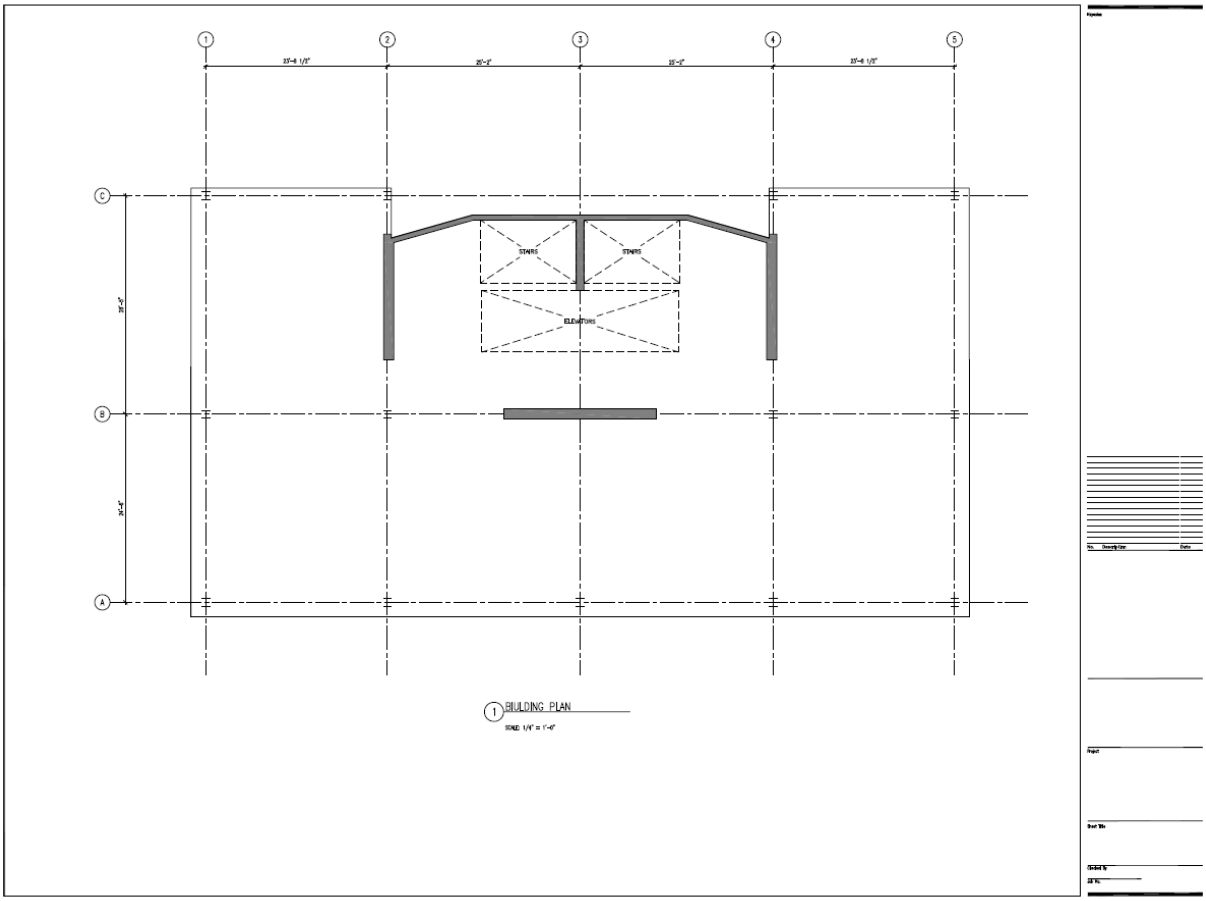


10.0 Designation of Roles

Agenda Maker: Alex Baur
Time Keeper: Karl Rybaltowski
Weekly Timesheet Collector: Rybaltowski
Master Schedule Maker: Chris Lee

Addenda A

A.1. This is the existing building plan given to IPRO 315 that will be amended:



A.2. These are the CAD scaling standards to adhere to:

Drawing Scale	Scale From							Text Size	Paper space Scale
	1/8	3/16	1/4	3/8	1/2	3/4	1		
	Scale Factors								1/#XP
1/8	1	1.5	1	3	4	6	8	12	96
3/16	0.6667	1	1.3333	2	2.6667	4	5.3333	8	64
1/4	0.5	0.75	1	1.5	2	3	4	6	48
3/8	0.3333	0.5	0.6667	1	1.3333	2	2.6667	4	32
1/2	0.25	0.375	0.5	0.75	1	1.5	2	3	24
3/4	1.6667	0.25	0.3333	0.5	0.6667	1	1.333	2	16
1	0.125	0.1875	0.25	0.375	0.5	0.75	1	1.5	12