IPRO 315 Project Plan
Fall 2008

Large Scale Structure

Advisor: J. Shen and J. Budiman

1.0 Objectives

The intent of the IPRO 315 is to design a large-scale structure. The focus of this IPRO is structural analysis. The advisors of this group thought it would be even more interested if IPRO 335 and IPRO 315 would mesh together to create a large green structure. The intent of IPRO 335 is to design a “green” and innovative building using the skills and input of students studying different majors at Illinois Institute of Technology. Our team has decided to design a replacement apartment building for Gunsaulus Hall on the Illinois Institute of Technology campus. Innovative technologies and practices will be researched and employed to design a “green” building. The decision to design a building for the IIT campus came about because it is an area that all of the team members could relate to and have a more realistic grasp on the project. For the remainder of the semester the two groups are planning on coordinating with each other on each step of the design process.

2.0 Background

A. This project is seeking engineering design guidance from Environmental Systems Design, Inc. – an engineering company located in downtown Chicago. The team is also talking with key staff members of IIT that are involved with the design and decisions of new facilities on campus. The purpose of this communication with the school is so that the team has some idea of what the school is looking for and the kind of budget the project would have.
B. There have been rumors floating around the IIT campus that Gunsaulus Hall will be in need of replacing in the near future. The team is trying to find the most feasible solution to designing a new living facility for the IIT campus that follows the LEED-NC guidelines. The team will be researching “green” technologies and providing information on why certain technologies are better than others for the site the team has chosen. With the building design the team is working on, the team wanted to

keep about the same amount of units on each floor and total that is in the existing building. The team also wanted to add some amenities to the campus that would be housed in the new residence building.

C. Currently, there is a big craze in the city of Chicago to get all new buildings LEED certified. This certification means that the building offers many "green" techniques and technologies. Some of these involve the type of materials chosen or the techniques for the indoor environment – decrease in use of water and better air quality. There team is also studying renewable energy sources, such as wind, geothermal, and solar power. There are many different projects within the city of Chicago that the team could look to for help in being as "green" as possible.
D. There are some scientific and cost issues that are present in this design case. The scientific issues that can arise are dealing with the new technologies, such as solar and wind. There can be issues with the feasibility and cost effectiveness of these technologies because they haven't been in existence for very long and the basic technology isn't at its most efficient. The cost issue stems off of the fact that most of these technologies are not the most cost-efficient. The installation of these technologies have such a high initial cost that sometimes it is just not a viable solution because the pay-back will take too long.

3.0 Methodology

A. Design an apartment building that optimize space on IIT Campus
B. Design I – 2 groups (approximately 15 hours)
    a. Architecture : This group designs the building and decides how many floors and rooms there are.(10 hours)
    b. Building Envelope : This group offers information on the site that we are building our structure. (5 hours)
C. Structural Analysis – 2 groups (approximately 20 hours)

a. Structure Design – This group decides how to construct the building. (10 hours)
b. Foundation Design – This group designs the foundation, basement and parking garage for the building. (10 hours)

D. Design II – 7 groups (approximately 49 hours)
a. Plumbing – This group decides and designs the plumbing structure. (7 hours)
b. Energy – This group chooses the type of energy and resources we will use after our building is built. This includes evaluating price and efficiency of many resources such as wind, fuel-cells, and solar. (7 hours)
c. AHU-HVAC – This group designs the heating and cooling system used in our structure. This includes the design of passive solar power. (7 hours)
d. Landscaping – This group designs the preservation of green outside the building. This includes building rooftop gardens and green lawns. (7 hours)
e. Fire Protection – This group design the fire protection of the building. (7 hours)
f. Electrical/Communication/Security – all electrical (7 hours)
g. Accessibility – for the handicapped (7 hours)

E. Each of these groups will submit a report on their group activities and choices. This will be apart of the final report for IPRO
F. Building a 3D model that will incorporate all of B-D.
G. Presenting our Structure in front of IPRO.
H. Total hours: 84 hours

4.0 Expected Results

A. The result of our effort will be blue prints and a scaled model of our structure. The blue prints will have all the information that a contractor would need to build the structure, including all information about the site.

5.0 Project Budget

A. TOTAL BUDGET = $650.00
   a. Supplies - $200
      i. This will include all printing for class handouts and other printing or supplies that we need to buy in order to facilitate the progress of the project.
   b. Model Supplies - $300
      i. This part of the budget encompasses all of the supplies that the team members will need to buy in order to build the prototype for IPRO Day at the end of the semester.
         1. These supplies will most likely include chip board, bass wood, mdf wood, foam core, museum board, insulation foam, acrylic, adhesives, etc.
   c. Travel - $150
      i. The combined teams of IPRO 315 and 335 plan on taking field trips to pre-cast concrete plants and other companies that are relevant to gathering information in order to better understand how the building would be built in reality.

6.0 Schedule of Tasks and Milestones

ID	*Task Name*	*Duration (days)*	*Start*	*Finish*	*Predecessors*	*Information*
	PROJECT ORGANIZATION	2				
1	Define Project	1	8/21/2008	8/21/2008		
2	Determine Requirements	1	8/21/2008	8/21/2008	1	
3	Division into Groups	5	8/21/2008	8/26/2008	2	
	DESIGN I					
4	Architectural Design	18	8/28/2008	9/15/2008	3,5	Came up with initial design
5	Building Envelope	1	8/28/2008	8/28/2008	3	Find information
	STRUCTURAL DESIGN					
6	Structure Design	10	9/15/2008	9/25/2008	4	
7	Foundation Design	10	9/15/2008	9/25/2008	4	
	DESIGN II					
8	Plumbing	21	9/25/2008	10/16/2008	6	

9	Energy	21	9/25/2008	10/16/2008		
10	HVAC	21	9/25/2008	10/16/2008	6	
11	Landscaping	21	9/25/2008	10/16/2008		
12	Fire protection	21	9/25/2008	10/16/2008	6	
13	Communication, Electrical, Security	21	9/25/2008	10/16/2008	6	
14	Accessibility	21	9/25/2008	10/16/2008	6,4'	
	PRESENTATION					
15	3D model	11	11/6/2008	11/17/2008	all	
16	Report, Brochure	11	11/6/2008	11/17/2008	all	
17	Poster	11	11/6/2008	11/17/2008	all	
18	Presentation	1	12/3/2008	12/3/2008	all	

7.0 Individual Team Member Assignments

A. Individual Team members

NAME	MAJOR, YEAR	SKILLS & STRENGTHS	EXPERIENCE & ACADEMIC INTERESTS	TEAM(S)
(IPRO 335)				
Aduroja, Oluwasesan	Architecture, Senior	AutoCAD, Illustrater, Photoshop, 3D max	Experience comes from IIT studio projects	Architecture Design, Building Envelope, Landscaping
Aguilar, Fabian	Civil & Architectural Engineering, Senior	computer drafting and design, 3D modeling, HVAC, plumbing, Fire Protection, Structure Analysis, energy efficiency analysis, electrical design and installation	7+ years of electrical and electronics work, computer drafting and design of architecutre, interested in electrical engineering, energy efficiency analysis, and plumbing design	Electrical & Communication Systems, Energy, Landscaping
Althoff, Sarah	Architectural Engineering, Senior	AutoCAD, Trane Trace 700 (heating and cooling loads software)	Experience as an intern at Teng & Associates working with the mechanical engineering group. Plans to do HVAC design after graduation.	Energy, HVAC System
Aubry, Curtis	Architectural Engineering, Senior	Electrical Engineering for buildings	Internship with ESD doing electrical engineering projects	Electrical & Communication Systems, Fire Protection
Chock, Chris	Chemical Engineering, Junior	photography, design, MATLAB	TechNews photo and assistant editors, student assistant to ChemE dept.	Plumbing System, Energy
Dewi, Fransisca	Architecture, Senior	AutoCAD, Illustrater, Photoshop, 3D max	Experience comes from IIT studio projects	Architecture Design, Landscaping
Dlugosz, Anna	Civil & Architectural Engineering,	AutoCAD, Illustrater	landscaping	Building Envelope, Landscaping

	Senior			
Douglas, Carlie	Architecture, Senior	AutoCAD, Illustrater, Photoshop, 3D max, Microsoft Office Suite programs	interested in innovative mid to high rise housing, experience comes from IIT studio projects	Electrical & Communication Systems, Building Envelope,
Olson, Sarah	Architecture, Senior	AutoCAD, Illustrater, Photoshop, 3D max, Excel, organized	integrating ideas for stronger product	Architecture Design, Landscaping, Energy, Fire Protection
Rodgers, Lucas	Architecture, Senior	AutoCAD, Illustrater, Photoshop, 3D max	IIT studio projects	Architecture Design, Building Envelope,
Stroot, Jaimi	Architectural Engineering, Senior	AutoCAD, HVAC and plumbing design	Summer internships with ESD doing HVAC design and plumbing design, want to learn more about plumbing design for after graduation	Plumbing System, HVAC System, Fire Protection
(IPRO 315)				
Aguirre, Arturo	Civil Engineering, Junior	AutoCAD	architecture and foundation design	Architecture Design
Antonio, Christopher	Electrical Engineering, Senior	Java, C++ and C#	interested in designing security systems	Electrical & Communication Systems, Energy, Security Systems
Cantone, Kyle	Architectural Engineering, Super Senior	AutoCAD	8 years-structural steel detailer, interested in structures	Structural Analysis & Design,
Chong, Hon-Kyu	Computer Engineering, Junior	Can speak English and Korean, knowledge of Java	Habitat for Humanity, Electrical systems, making website for IPRO 315 and 335	Electrical & Communication Systems, Energy, Security Systems
Forneris, Craig	Architecture, Senior	AutoCAD, 3D Max, Rhino, Flash, Revit, Photoshop, Illustrator SAP2000, HTML coding, CNC physical model ability, secretarial and presentation skills, group leadership, and music	Played music semi-pro, owns a freelance website development corp., TA for Professor Land, works at VRA architects designing banks, interested in architecture and computer aided form generation	Architecture Design, Energy, Security System
Freund, Ryan	Civil Engineering, Junior	AutoCAD, Illustrater, Photoshop, 3D max	Strucutral analysis	Structural Analysis & Design, Foundation

				Analysis & Design,
Khan, Qudsia	Civil Engineering, Senior	structures, foundations, Autocad, SAP2000 structural analysis program	Intersted in learning more about foundation design	Structural Analysis & Design, Foundation Analysis & Design,
Laschiazza, Elizabeth	Civil Engineering, Senior	structures, foundations, Autocad	Interested in plumbing and electrical	Plumbing System
Muresan, Lucian	Architectural Engineering, Junior	AutoCAD, Illustrater, Photoshop, 3D max	architecture and foundation design	Structural Analysis & Design,
Rus, Bogdan	Civil Engineering, Senior	Structures, AutoCad	internship with civil engineeering firm last summer, worked on analysis of foundation	Structural Analysis & Design, Foundation Analysis & Design,
Scully, Dawveed	Architectural Engineering, Junior	AutoCAD, Illustrater, Photoshop, 3D max	Interested in Architecture, worked at architecture firm last summer	Architecture Design, Building Envelope, Landscaping
Steffen, Trent	Civil Engineering, Senior	structures, foundations, geotechnical, Autocad, SAP2000 structural analysis program	Internships with civil engineering firms for 2 summers, site development, structures, geotechnical, green building, sustainable site development	Foundation Analysis & Design, Plumbing System
Stenson, Amanda	Mechanical Engineer, Junior	mechanics analysis	interested in structure and foundation analysis	Foundation Analysis & Design, Energy, HVAC System
Urdiales, Miguel	Civil Engineering, Junior	Foundation and structual analysis	intersted in learning more about foundation design	Structural Analysis & Design, Foundation Analysis & Design,
Yeung, Helen	Civil Engineering, Senior	Foundation analysis and structural analysis	internships with civil enginering firms	Structural Analysis & Design, Foundation Analysis & Design,

B. Team Leaders
   a. IPRO-315: Trent Steffen
   b. IPRO-335: Lucas Rogers

C. Sub Teams

a. Architecture Design

Lucas Rogers,
Joe Parker,
Craig Forneris
Sarah Olson,
Fransisca Dewi,
Aduroja Feyi,
Dawveed Schully,

b. Structural Analysis and Design

Qudsia Khan,
Bogdan Rus,
Helen Yeung,
Ryan Freund,
Miguel Urdiales,
Kyle Cantone,
Lucian Muresan,

c. Foundation Analysis and Design

Bogdan Rus,
Trent Steefen,
Ryan Freund,
Miguel Urdiales,
Qudsia Khan,
Amanda Stenson,
Helen Yeung,

d. Plumbing System

Jaimi Stroot
Chris Chock
Trent Steffen
Elizabeth Laschiazza

e. Electrical and Communication Systems

Curtis Aubry
Carlie Douglas
Hon-Kyu
Fabian Aguilar
Chris Antonio

f. Building Energy Sources

Chris Chock
Chris Antonio
Craig Forneris

Sarah Althoff
Fabian Aguilar
Amanda Stenson,

g. Building Envelope

Anna Dlugosz
Carlie Douglas
Lucas Rogers
Aduroja Feyi,
Dawveed Schully

h. HVAC System

Sarah Althoff
Jaimi Stroot
Amanda Stenson,

i. Landscaping

Dawveed Schully,
Aduroja Feyi,
Joe Parker,
Fransisca Dewi,
Anna Dlugosz
Fabian Aguilar

j. Fire Protection System

Jaimi Stroot
Sarah Olson
Curtis Aubry

k. Security System

Craig Forneris
Joe Parker,
Chris Antonio

D. Sub Team Leaders

a. Architecture – Lucas
b. Structural Analysis and Design – Helen
c. Foundation Design – Trent
d. Plumbing – Jaimi
e. Electrical and Communication Systems – Curtis
f. Building Energy Sources – Craig
g. Building Envelope – Anna
h. HVAC – Sarah A.
i. Landscaping – Dawveed
j. Fire Protection – Sarah O.
k. Security Systems – Joe

8.0 Designation of Roles

A. Minute taker – Amanda Stenson and Sarah Altoff
B. Agenda Maker – Helen Yeung and Curtis Aubrey
C. Time Keeper – Craig Forneris and Hon-Kyu Chong
D. Weekly Timesheet Collector – Fabian Augilar and Kyle Cantone
E. Master Schedule Maker – Amanda Stenson and Anna Dlugosz
F. iGroups – Ryan Freund and Chris Chock