IPRO It takes a team! INTERPROFESSIONAL PROJECTS PROGRAM

# IPRO 311: Energy and Facility Planning for Delta Tau Delta Fraternity
# Fall 2009
# Faculty Advisor: Nancy Hamill


"Change it. Build it. Live it."

## I. TEAM CHARTER

1. Team Information:

Nancy Hamill (advisor)
Email: hamill@iit.edu

Timothy Schug
Email: tschug@iit.edu

Joshua Bradley
Email: jbradle4@iit.edu

Noah Cahan
Email: ncahan@iit.edu

Dan Dobbin
Email: ddobbin@iit.edu

Jeff Hallenbeck
Email: jhallenb@iit.edu

Davyd Jordan
Email: djordan3@iit.edu

Brad Strandquist
Email: bstrand1@iit.edu

Jacob Dohm
Email: jdohm@iit.edu

Kent Hoffman
Email: khoffma2@iit.edu

Woong-Kyo Lee
Email: wlee25@iit.edu

Nathan Waisath
Email: nwaisath@iit.edu

Joshua Bradley

- I was a part of the group that originally brainstormed the idea for this IPRO, so I bring a lot of passion and vision to the table. I am detail oriented and work to get things done on time. I like to think I have good management skills, and will use these skills to motivate the group and not overpower it
- I come to the table with very little expertise in the areas of architecture, energy auditing, and building concepts. I would like to learn more about the structure of a building and how the mechanical/electrical systems and structure work together to perform in regards to minimizing energy consumption. I would like to work on being more proactive. In a class where there is only a final grade – I want to be proactive about the project and not worry more about the grade.
- I expect the project to demanding for the group members. Most of us have never been in an IPRO before and the idea was born from people outside of the IPRO system – which means we have an opportunity to separate this project from the sometimes negative experiences associated with IPROs. I hope this project will act as a catalyst for real change on the IIT campus. I expect the work we do to be professional enough to be of real value when discussing the future of the Greek Quad and the Delta Tau Delta shelter.

Noah Cahan

- My strengths for this projects include but are not limited to being a good team player who is open many ideas. I pride myself in creative thinking and the ability to work through ideas. I can draw, and have a good understanding of visual communication. I have a good understanding of general construction and architectural concepts. I have also had experience in energy use evaluation and recommendation.
- I hope to learn how to apply my architectural background to a real world project. From this experience I would hope to become more competent in principals of building restoration as well as construction methods and project development
- I expect that every one contribute equally to this project and that they are able to reasonably choose the direction of their efforts. I also expect that we hold back on creating more work for ourselves than necessary. In addition, I believe we should find a field for our efforts of which leads us to giving back to the surrounding community, be it IIT or the adjacent Greeks

Daniel Dobbin

- I have experience in mathematics, particularly discreet, computer science (C and Java), problem solving. I am pretty good with grammar and general word play and I am good at following instructions.
- I would like to develop my cooperative work skills. I also think this class will allow me to work on a real life problem. I am excited because almost everything I do in this IPRO will be a new experience.
- I hope that this project will eventually lead to physical results, not just a plan. These results should also be applicable outside of the scope of the project. As for the project itself, I would expect the team to work very well together. Most of the team has already been working together for at least two years.

Jeff Hallenbeck

- As part of a team in general, I am able to complete almost any essential and/or mundane task in a timely and satisfactory manner. My specific strengths based on this IPRO's needs, however, include visual preparations (such as diagrams or models); group and individual presentations in front of peers or critics; research of building materials/methods; basics of architectural programming and accompanying design decisions; building envelope thermal retention calculations; and basic mechanical systems knowledge. I am pretty flexible and willing to do whatever tasks the team needs fulfilled
- I think the biggest thing I'd like to work on through this IPRO is gaining some leadership skills. Even without fulfilling the role of a "team leader," necessarily, I think I'll gain some valuable experience working with other people toward a common goal and asserting my plans and opinions.

  I also think the IPRO gives us—as a team and as individuals—a unique opportunity to develop our own group plan and to fulfill it to the best of our abilities with few guidelines or restrictions. I think in that regard, we will all be learning some indispensable lessons about the way real-world companies and businesses operate. I am looking forward to this aspect of the class.

- I would like to see this project reach a level that is worth showing to a jury (i.e. that is not simply a self-indulgent search into the viability of rehabbing the shelter or what-have-you.) I hope the project reaches a realistic conclusion of sorts, and I hope that we are able, through our research and programming questionnaires, to connect it to some kind of a "bigger picture" that takes the rest of the quad and the IIT community into account. I realize that this is a fairly large amount of work for ten people to accomplish in one semester, but I think

that most of these kinds of issues can at least be touched on and collated into the final deliverable in some kind of semi-polished and relevant way.

Davyd Jordan

- On top of finishing assigned tasks that are given to me and contributing to the group both when assigned as well as with my own initiative, I feel that my current schooling on architecture is one of my major attributes to this team. While we have many other architecture majors in this IPRO, my current classes this semester are some of the more relevant courses to this project that a student takes in their five years of schooling. I hope that this IPRO and my other classes will go hand in hand and help the other develop. I also have been working at a firm during breaks in school for the last three years. I feel that although I am only a third year student that my experience from working will allow me to contribute quite a bit more to the team and the project.
- I think that this IPRO will give me alot of experience in how an architectural project develops from the very beginning stages. I hope that it will supplement my current classes and provide reinforcement for what I am learning in my normal schooling. I also hope I can grow from the experience as this is a project developed by us students and is being carried out almost exclusively by us. We are creating our own successes and failures and I think we will all learn from it as long as we keep an open mind.
- I expect that everyone in the group will be motivated to some extent and that we will all push hard to complete our tasks and to create a comprehensive product by the end of the semester. I would really like this to be an IPRO that succeeds and in a few years becomes a reality rather than a nice idea. I do not expect that by the end of the semester we will have a built house ready to be occupied but I would hope that we could deliver some clearly defined work that will point the next IPRO group in the direction we will have set for them.

Brad Strandquist

- As a member of IPRO 311, I plan on contributing to the team firstly by being responsible for the tasks given to me and by being timely in delivering those tasks. Other ways I plan on contributing are by being highly motivated and by motivating others in the group. I also maintain good organization and communication skills which are always a must for group work. My technical knowledge might not be at the level that is necessary, but I am definitely open and willing to learn and do personal research
- I'm really excited about being able to get the technical knowledge that I currently lack. I hope that the hands-on experience with building construction and renovation will enhance my skill set greatly. I'm also unsure as to what the

process of solving a real life problem like this one is like, so I'm looking forward to being a part of that process
- My biggest expectation is that, by the end of the semester, we actually have concrete deliverables and basically something to show for all of the work we've done. To get to that point, I expect that group members work together in a hard-working and respectful atmosphere. I also expect that the DeIt members of the group aren't too imposing over the non-DeIt members

Jacob Dohm

- As an Architecture major I have experience in programming, design, green design, and formatting documents and presentation materials.
- I would like to develop my team skills. Also it will be a new experience working on subgroups for design, active solar energy, and structural analysis.
- I would like to see us run smoothly as a team, to come out with a practical solution, and to be open to gaining new experiences

Kent Hoffman

- I am an Architecture student who has excellent skills in planning, programming, AutoCAD, Photoshop. I also have ability to work within large groups to accomplish tasks correctly and efficiently. Time management and ability to keep others on track as well is another skill I can exercise. I also believe that if a job must be done, it should always be done right the first time with everybody putting their best foot forward.
- Some skills that I'd like to develop would be the ability to put my knowledge of architecture to use in the field and in real life applications. I would also like to learn how to work well and cohesively with individuals outside of the field of architecture. This IPRO also offers the ability for me to learn how to examine a structure in depth.
- My overall expectations about the project are to be able to understand the steps in a renovation process from beginning to end. I also would like to gain a greater understanding of green technology systems and how they can be integrated into a fraternity situation where such a concept does not yet exist. Furthermore and most importantly of all, I expect to have a good time with my team members and create a great and outstanding solution to this problem placed in front of us.

Woong-Kyo Lee

- My major is aerospace engineering I am sticking to it ,especially, I like thermodynamic. I think I can research in audit energy and enhancing energy

efficiency of boiler. Any analyzing efficiencies will be welcome. Also, I can help somebody to analyze mechanic structures

Nathan Waisath

- As an architecture student I have experience in design creativity, graphic presentation, architectural knowledge, passive/active systems and basic understanding of calculations, structural design and basic understanding of calculations, as well as programming experience.
- I would like to work on verbally expressing ideas while addressing an audience, organization rigor, energy usage understanding, and time management.
- I would like to see the team work well together. Team atmosphere helps pursuit of goals. I would also like to to gain skills from other team members and help others with skills I have. I also think this an interesting opportunity to learn about fraternity life. We must work hard to have a presentation we are proud of.

Team Name: Delta Shelter

Team Logo:


Team Motto: Change it. Build it. Live it

2. Team Purpose and Objectives

The Delta Tau Delta fraternity wants to make their current house as energy efficient and green as possible. We will look at all aspects of the DTD house and their operations to create a more energy efficient fraternity. During this IPRO we will consider possible alternatives to many issues including but not limited to: mechanical heating system, building envelope, thermal properties of buildings perimeter, roofing materials, air infiltration, ventilation, and occupancy trends. In general, we will collect information regarding the existing conditions and itemize all improvements that could be made to

create a more energy efficient fraternity. In addition, we will look for grant assistance to help pay for future energy efficiency upgrades. This will allow us to address what is possible through comparison of funding and needs.

We will explore all aspects of the building, site, and operation systematically, so that new and improved methods can be considered. The IPRO team will investigate programmatic aspects of the current fraternity living, and predict future modifications. In essence, DTD IPRO will have a road map for possible energy improvements for their facility, resulting in an example design solution for fraternity life. We hope that our example portrays qualities interesting to broader issues of fraternal housing, fraternal population, university enrollment, and university planning.

## 3. Background

The recipients of this IPRO's service are the active members of Delta Tau Delta International Fraternity, Gamma Beta chapter at the Illinois Institute of Technology. The shelter is owned and ultimately managed by the fraternity's House Corporation, which is a group comprised of Gamma Beta alumni. The House Corporation would act as the "client" and would be responsible for any major financial or legal decisions regarding the shelter. In addition, the Illinois Institute of Technology is a stakeholder in that the property is owned by the school, though the building is owned by the House Corporation.

The shelter is 50 years old and may not comply with current code and industry standards. The building's envelope and mechanical systems do not live up to the expected efficiency standards common in today's market and should be redesigned. The original architectural programming is no longer in accordance with the contemporary needs of fraternity men. Also, the way in which the shelter was planned with in the Greek Quad and the IIT campus should be reconsidered in a way that would improve social interaction.

The team will conduct an energy audit in order to determine how much energy is being used and where it is going. Based on the results of this investigation a cost benefit analysis can be made to see what improvements will show a payback within its life-cycle. Another major component of the project is an architectural reprogramming and redesign proposal. This includes planning and a structural analysis of the shelter to indicate the extent of rearranging or expanding the building.

The Gamma Beta chapter of Delta Tau Delta has existed at the Armor Institute and IIT since 1901. In this time the chapter had resided in 7 houses, mostly along Michigan Ave. in gray stone mansions built by the meatpacking elite. The current house built in 1959 was the first house built with the intention for a fraternity. There have

been no previous attempts to tackle the current issues of living "green". The only issues are of where to live and how to maintain such a building for the patterns of a fraternity.

The IPRO team is mostly comprised of Delta Tau Delta fraternity members, and the team is dealing with a solution specifically for Delta Tau Delta; members of the team who are not in the fraternity may feel excluded unless certain provisions are upheld and each member acts in a professional and impersonal manner. Similarly, the members of the fraternity who are on the team must remain impartial and not allow their personal wishes to work their way into the team solution. Lastly, there may be moments when code violations are discovered through investigating the shelter closely, and their swift and satisfactory repair may not always be financially attainable.

We will research other fraternity shelters and Greek societies on other campuses. After investigation and redesign, the IPRO team will seek to materialize the actual renovation of the fraternity's shelter by dealing through the House Corporation.

4. Team Values Statement

Members of IPRO 311 will always conduct themselves as a team. Each member will to go to class and subgroup meetings on time and ready to participate. We will be accountable to each other and ourselves by doing the work we are assigned. If we cannot fulfill our commitments to come to a meeting, finish assignments, or meet deadlines we will let our team members know in advance and request extensions. Our team will use communication to foster strong teamwork. We will speak up and voice our concerns and ideas and will challenge ourselves and our teammates to be active listeners. Team members will also be proactive and will think about the success of the project as a whole and not just each member’s individual commitment. We will take full advantage of the technology available such as IGroups and email to maintain project activity outside of class.

II. PROJECT METHODOLOGY

1. Work Breakdown Structure

After assessing all aspects of the project we found it necessary to divide the work into three different phases. The first phase focuses on identifying all problems with the existing condition of the building, and programming the space so that it better fits the needs of contemporary fraternity men. The second phase is focused on researching solutions for all of the problems that were discovered in Phase 1, as well as evaluating the new program and designing the space accordingly. The third and final phase consists of refining all of our ideas in order to prepare them for a proposal process. Within each phase, sub-groups will be created and sub-group leaders will be assigned.

Phase 1: Data Collection and Programming

a. Data Collection - Assessment of all problems of the existing building
   i. Envelope
   ii. Mechanical
   iii. Electrical
   iv. Plumbing
   v. Code
   vi. Structural
   vii. Architectural

b. Programming - Creating a program that better fits the needs of the occupants
   i. Gamma beta internal
   ii. External idea hunting
   iii. General humanistic needs

Phase 2: Research for new technology, Design, Funding

a. Evaluating Quantitative Results of Phase 1

b. Research Solutions - Discovering solutions to all problems found in the phase 1 data collection
   i. Envelope
   ii. Mechanical
   iii. Electrical
   iv. Plumbing
   v. Code
   vi. Structural
   vii. Architectural

c. Spatial Planning - Planning the space according to the results of programming
   i. Concept Development
   ii. Drawings

d. Researching Avenues for Funding - Searching for special grants or loans to finance the project

Phase 3: Proposal/Implementation

a. Refine Ideas
b. Presentation - Presenting the plans to our client and on IPRO day

Realizing that our project involves large-scale problems that require costly solutions, it is understandable that the solutions that we discover with will not actually be implemented. For this reason, all testing and analysis will be done through research. For example, since we can't physically replace our boiler with a new one to test the difference in efficiency, general research on new boiler systems and their overall efficiency will have to suffice. Also, much of the data that we would acquire from testing our solutions has already been tested, such as the efficiency of compact fluorescent light bulbs in comparison to incandescent light bulbs. In this case, instead of actually changing all of our bulbs and testing them, we can use data that has already been collected and apply it to our specific energy situation.

It seems very reasonable that we can accomplish all of our tasks within the allotted timeframe. However, we might not have enough resources to accomplish a large portion of our tasks. The first phase of our project may require the work of professionals to evaluate the current status of our building systems. It is going to be difficult finding such professionals to work for a really low cost or even for free. It is possible that we, the members of the group, can conduct all of the necessary surveys of the current building, but none of that work would be validated seeing as we are not professionals.

We will be running as much of a flat organization a possible, but we have split up the two key tasks and given them leaders. The leader of the programming team is Davyd Jordan and the leader of the research team is Josh Bradley

Programming Sub Team:

Gamma Beta internal responsibilities: To talk with current and past chapter member that have lived in this shelter or previous shelters to get an idea for what the need are from a purely internal lens. This will give us information on what makes our chapter unique from others and will help to maintain our character through any changes that may occur. Major responsibilities include but are not limited to: surveys, interviews, inventory, and historical analysis.

External idea hunting: this person responsibility's is to look at many fraternity houses and see how they live with in their house. This team should in some sense, try to break down the lens of the gamma beta experience and the IIT experience so we can learn to improve our Greek system. Major responsibilities include but are not limited to: surveys, interviews, inventory, historical analysis, comparative analysis.

Humanistic need: Human needs relates to the social and biophysical nature of people and how they live and react to an environment. Topics of spatial comfort, social interaction, and academic success are in the fraternity's best interests. Thought should be conducted on previous research done on this topic. Sociologist Edward Hall and architect Richard Neurta are two of many that have written on the subject. Major responsibilities include but are not limited to: surveys, interviews, historical analysis, and research.

Research Sub Team:

Envelope: this team is concerned with the building enclosure, and how it responds to temperature, moisture, air, snow, sun, and human contact, windows, walls, and roof should be evaluated on there quality, life expectancy, and existing condition. Current technology or different methods should be compared to our existing condition. Professors or professionals should be consulted if necessary.

Mechanical: our current mechanical heating, domestic hot water, and ventilation systems should be analyzed for quality and consumption of gas and electrical. The houses historical gas usage from such equipment should be analyzed as well. Current technology or different methods should be compared to our existing condition. Professors or professionals should be consulted if necessary.

Electrical: Historical electrical use should be documented and analyzed. Equipment should be inventoried and occupants trends should be evaluated for electrical use patterns. Quality of distribution methods should be evaluated. Current technology or different methods should be compared to our existing condition. Professors or professionals should be consulted if necessary.

Plumbing: Current plumbing should be evaluated for quality. Water usage should be documented and analyzed on where savings can come from. Fixtures and piping should be located and evaluated. Current technology or different methods should be compared to our existing condition. Professors or professionals should be consulted if necessary.

Code: The shelter should be investigated for violation of building code and fire safety.

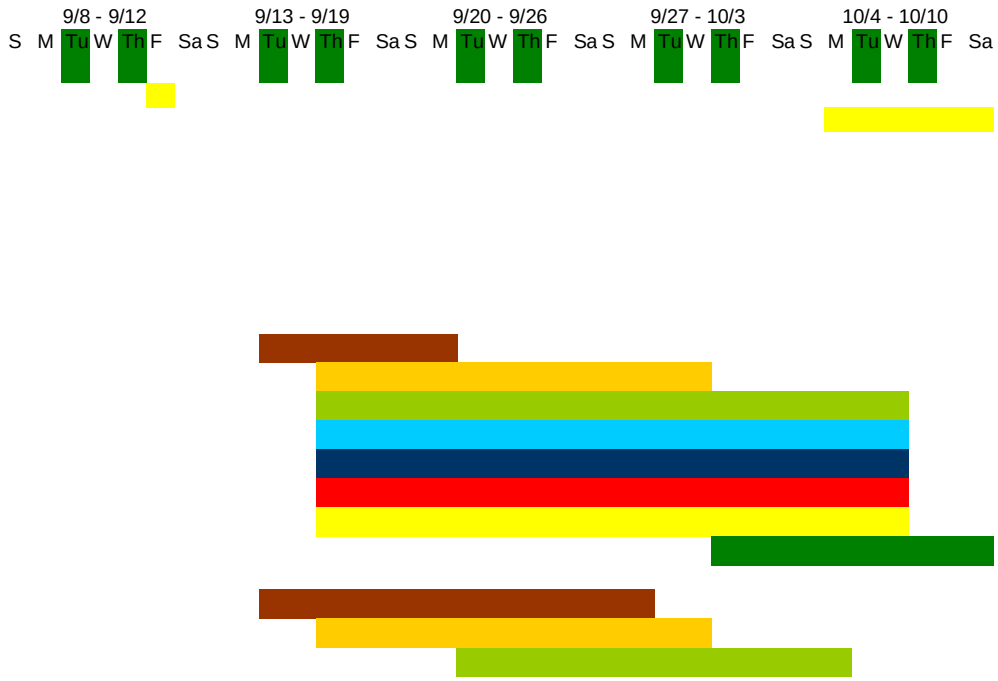
Structural: A structural analysis of the building should be conducted to identify the existing condition. Proposals for a third floor, excavation of eastern third of the basement level, and punctures in the buildings envelope should be included in the spectrum of investigation. Current technology or different methods should be

compared to our existing condition. Professors or professionals should be consulted if necessary.

Architectural: This team should be in charge of integrating all of the previous building system and programming themes into a coherent whole. The team should also come up with many design solution for our initiative this semester to be kept as a record of our ideas and thinking processes. Also, any architectural drawing will come from this team.

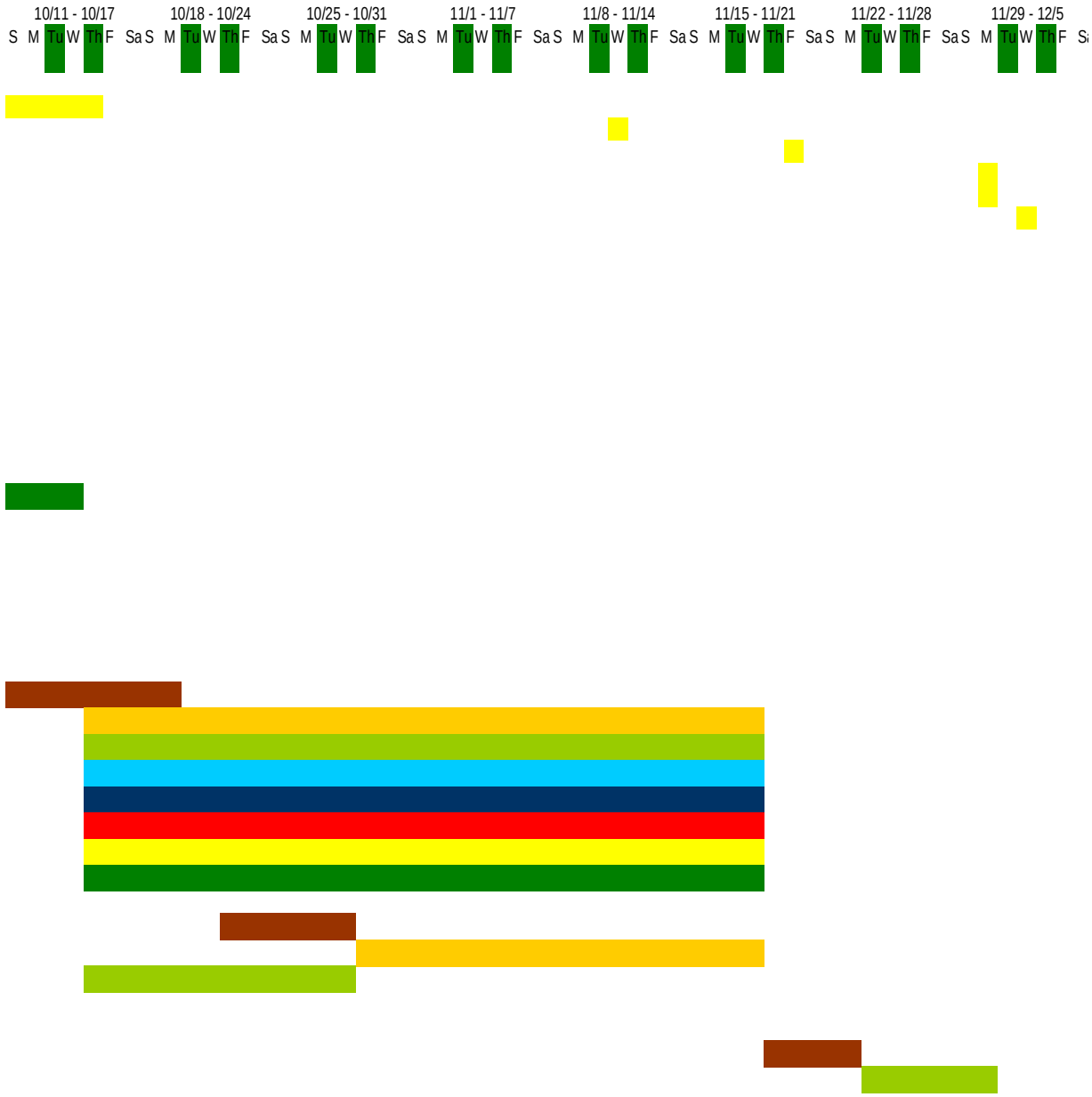
IPRO It takes a team!
INTERPROFESSIONAL PROJECTS PROGRAM

| Task | Start Date | Duration | End Date | Task Manager |
|---|---|---|---|---|
| **Project Deadlines** | | | | |
| Project Plan Due | 9/11/2009 | 0 | 9/11/2009 | |
| Midterm Review Presentation | 10/5/2009 | 10 | 10/15/2009 | |
| Ethics Reflective Report | 11/11/2009 | 0 | 11/11/2009 | |
| Final Project Report (draft) | 11/20/2009 | 0 | 11/20/2009 | |
| IPRO Day Abstract/Brochure | 11/30/2009 | 0 | 11/30/2009 | |
| IPRO Day Poster | 11/30/2009 | 0 | 11/30/2009 | |
| IPRO Day Final Presentation | 12/2/2009 | 0 | 12/2/2009 | |
| **Phase I** | | | | |
| Data Collection | | | | Josh B. |
| Photo Documentation | 9/15/2009 | 7 | 9/22/2009 | Brad S. |
| Envelope | 9/17/2009 | 14 | 10/1/2009 | Josh B. |
| Mechanical | 9/17/2009 | 21 | 10/8/2009 | Nathan W. |
| Electrical | 9/17/2009 | 21 | 10/8/2009 | Kent H. |
| Plumbing | 9/17/2009 | 21 | 10/8/2009 | Woong K. |
| Code | 9/17/2009 | 21 | 10/8/2009 | Noah C. |
| Structural | 9/17/2009 | 21 | 10/8/2009 | Josh. B |
| Architectural | 10/1/2009 | 14 | 10/15/2009 | Noah C. |
| Programming | | | | Davyd J. |
| Gamma Beta Internal | 9/15/2009 | 14 | 9/29/2009 | Brad S. |
| External Idea Hunting | 9/15/2009 | 14 | 9/29/2009 | Jake D. |
| General Humanistic Needs | 9/15/2009 | 14 | 9/29/2009 | Jeff H. |
| **Phase 2** | | | | |
| Research - Solutions | | | | |
| Evaluation of Results | 10/8/2009 | 12 | 10/20/2009 | ALL |
| Envelope | 10/15/2009 | 35 | 11/19/2009 | |
| Mechanical | 10/15/2009 | 35 | 11/19/2009 | |
| Electrical | 10/15/2009 | 35 | 11/19/2009 | |
| Plumbing | 10/15/2009 | 35 | 11/19/2009 | |
| Code | 10/15/2009 | 35 | 11/19/2009 | |
| Structural | 10/15/2009 | 35 | 11/19/2009 | |
| Architectural | 10/15/2009 | 35 | 11/19/2009 | |
| Spatial Planning | | | | |
| Concept Development | 10/22/2009 | 7 | 10/29/2009 | |
| Drawings and Plans | 10/29/2009 | 21 | 11/19/2009 | |
| Research - Avenues for Funding | 10/15/2009 | 14 | 10/29/2009 | Brad S. |
| **Phase 3** | | | | |
| Refine Ideas | 11/19/2009 | 5 | 11/24/2009 | ALL |
| Presentation | 11/24/2009 | 7 | 12/1/2009 | ALL |



IPRO It takes a team!
INTERPROFESSIONAL PROJECTS PROGRAM

| Task | Start Date | Duration | End Date | Task Manager |
|---|---|---|---|---|
| **Project Deadlines** | | | | |
| Project Plan Due | 9/11/2009 | 0 | 9/11/2009 | |
| Midterm Review Presentation | 10/5/2009 | 10 | 10/15/2009 | |
| Ethics Reflective Report | 11/11/2009 | 0 | 11/11/2009 | |
| Final Project Report (draft) | 11/20/2009 | 0 | 11/20/2009 | |
| IPRO Day Abstract/Brochure | 11/30/2009 | 0 | 11/30/2009 | |
| IPRO Day Poster | 11/30/2009 | 0 | 11/30/2009 | |
| IPRO Day Final Presentation | 12/2/2009 | 0 | 12/2/2009 | |
| **Phase I** | | | | |
| Data Collection | | | | |
| Photo Documentation | 9/15/2009 | 7 | 9/22/2009 | |
| Envelope | 9/17/2009 | 14 | 10/1/2009 | |
| Mechanical | 9/17/2009 | 21 | 10/8/2009 | |
| Electrical | 9/17/2009 | 21 | 10/8/2009 | |
| Plumbing | 9/17/2009 | 21 | 10/8/2009 | |
| Code | 9/17/2009 | 21 | 10/8/2009 | |
| Structural | 9/17/2009 | 21 | 10/8/2009 | |
| Architectural | 10/1/2009 | 14 | 10/15/2009 | Noah C. |
| Programming | | | | |
| Gamma Beta Internal | 9/15/2009 | 14 | 9/29/2009 | |
| External Idea Hunting | 9/15/2009 | 14 | 9/29/2009 | |
| General Humanistic Needs | 9/15/2009 | 14 | 9/29/2009 | |
| **Phase 2** | | | | |
| Research - Solutions | | | | |
| Evaluation of Results | 10/8/2009 | 12 | 10/20/2009 | ALL |
| Envelope | 10/15/2009 | 35 | 11/19/2009 | |
| Mechanical | 10/15/2009 | 35 | 11/19/2009 | |
| Electrical | 10/15/2009 | 35 | 11/19/2009 | |
| Plumbing | 10/15/2009 | 35 | 11/19/2009 | |
| Code | 10/15/2009 | 35 | 11/19/2009 | |
| Structural | 10/15/2009 | 35 | 11/19/2009 | |
| Architectural | 10/15/2009 | 35 | 11/19/2009 | |
| Spatial Planning | | | | |
| Concept Development | 10/22/2009 | 7 | 10/29/2009 | |
| Drawings and Plans | 10/29/2009 | 21 | 11/19/2009 | |
| Research - Avenues for Funding | 10/15/2009 | 14 | 10/29/2009 | Brad S. |
| **Phase 3** | | | | |
| Refine Ideas | 11/19/2009 | 5 | 11/24/2009 | ALL |
| Presentation | 11/24/2009 | 7 | 12/1/2009 | ALL |



2. Expected Results

Program

a. Gather Program Team
b. Create questionnaire

i. Identify immediate needs

ii. Develop rough draft

iii. Contact Firms for example questionnaires

iv. Complete write up of questionnaire

v. Distributed to DTD community (Brothers, alumni, and DTD nationals)

vi. Compile questionnaire data

c. Determine square footage of needed spaces
d. Start initial architectural design

Existing Building Research

a. Energy Audit
b. Needs Assessment

Green Design Research

a. Discover wanted green energy solutions from client
b. Select needed products in order to maximize building efficiency

By creating a program for the project we will be able to determine the exact elements this chapter of Delta Tau Delta wishes to have in their chapter house. The program will also allow us to conclude if there are any existing programmatical elements of the building that need to be reevaluated, redone, or simply removed.

Through the Existing Building Research Study, our group will be able to identify the status of the current structure. Elements such as the house's mechanical and safety systems, plumbing, electrical work, and structural integrity will be examined in order to conclude which of these systems are in need of a simple repair, a major renovation, or complete overhaul.

An energy audit will also be conducted on the Delta Tau Delta structure to collect current data of how much energy is used to heat and cool the building along with provide the house with basic services (lights, kitchen appliances, etc.) Financial records will also be looked at in to see how much money is spent to satisfy the energy needs of the house.

The final results of this current stage of the IPRO will contain a completed program and program analysis to determine the wants and needs of the men in the Delta Tau Delta chapter house. A square footage and design needs assessment will also come from a completed program study.

Through the energy audit and the building needs assessment, we will discover the needed structural and design changes that must be accomplished in order to better fit the chapter house. This will also allow us to determine what green technology can be utilized to make the house more sustainable and cost efficient to run.

Program

- An overall study of residential structures, specifically Greek housing

- A program that can identify the needs of the DTD chapter and bring out any other ideas that have not yet been brought to the table

- Report detailing the specific wants and needs of the DTD house and the square footage needed to accomplish their needs dictated by the program

Existing Building Research

- An overall understanding of the buildings structure and design will be discovered

- Energy audit will be conducted which will produce the efficiency of the existing structure in both energy and dollar amounts. This audit will also detail the current status of the buildings mechanical systems.

- Needs assessment will detail which parts of our plan can be accomplished and what other changes we will have to make to our overall plan and possibly the overall structure in order to accomplish our teams goal

Green Design Research

- Identify systems that are affordable and able to maximize efficiency at the Delta Tau Delta house

- Research of possible grants will produce a final total of funds which can be obtained through outside sources and what monetary commitment those at the DTD chapter house will have to commit too

At the end of this semester our group aims to complete the following:

- A full energy assessment need of the house to discover how the current mechanical, electrical, and plumbing systems within the structure function, what maintenance might have to be done, and how it will be possible to make the building and its systems more efficient

- A program created, answered, and studied

- A structural analysis of the building and a plan of what may or may not be altered in future renovations

- A comprehensive list and understand of which Green Technologies can be installed within the chapter house to make it more sustainable

One of the first challenges our group will encounter is the energy audit. Currently no one has ever completed an energy audit before nor have any real grasp on how to complete such a task. This can also be said for the needs assessment of the structure. However, through research and using our contacts with professionals in the field, our group can easily overcome these obstacles.

Throughout the work with the energy audit and the needs assessment, our group might also discover code violations within the Delta Tau Delta structure. Currently the house is able to function normally and in a safe manor however that does not necessarily mean there aren't code violations and dangers lurking throughout the building. Although this current IPRO has been set up in order to simply examine these issues, if there are code violations brought to light and placed in front of the public eye of the school the current chapter may need to provide immediate funds in order to remedy the problem which may impede the renovation of the house in the grand scheme of things.

Lastly, at this current time we have been sifting through the building's structural plans are under the assumption that a third floor can be added to the house. This however will have to be examined in great depth to see whether or not this can be done and what effect it will have on the project planning.

The expected results will allow us to see where the Delta Tau Delta chapter stands in possibly renovating their house. Through the energy audit and building needs

assessment we will be able to determine in what shape the house is in structurally and see if it would be best for the Delts to renovate their house or tear it down and start all over again in order to satisfy their needs dictated by the program and their want for a more sustainable structure. This information can also be used as a model for the rest of the Greek Quad if other houses wish to make their house more sustainable as well.

3. Project Budget

| | |
|---|---|
| Surveys | $50 |
| Professional Analysts(Structural, Electrical, etc.) @ $200/hr | $600 |
| Total | $650 |

4. Designation of Roles:

Minute Taker - Brad will record all meeting minutes, decisions made, task assignments, and will post minutes on igroups.

Agenda Maker - Josh will look at old minutes and prepare an agenda for the upcoming class meetings. These agendas will be emailed out and posted on Igroups.

Time Keeper - As the only person in the group to have taken an IPRO before, Noah will be responsible for making sure meetings go according to the agenda.

Igroups Moderator - Jake will be responsible for organizing the team's igroups account and ensuring it is updated regularly.