

**Final Report**

**I PRO 311**



## 1.0 Introduction

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The IPRO 311 Team's overall objective was to create a conceptual design and branding of IIT as an eco-friendly campus, promoting sustainability to students, faculty and visitors. The IIT Marketing and Communication Department sponsored the IPRO to portray a message of the university's accomplishments in the area of sustainability and future capabilities. Furthermore, this project was driven by the interests of two IIT trustees with an interest to enhance the visibility of the IIT Main Campus from the I-94 expressway and other challenging vantage points (US Cellular Field, Sears Tower, McCormick Place, 2016 Olympics venues, etc.) Disney Imagineering was a project partner participating with the Team through brainstorming discussion assisting the Team in building the IIT Brand.

Initially, the focus of the IPRO was the development of signage that could represent sustainability and be situated at a prominent location on campus visible to the public. After several class discussions, the vision of the IPRO broadened, to develop an overall campus sustainable conceptual design, incorporating signage as one of the elements. Successful completion of the goals presented here will require each participant to gain useful experience and knowledge regarding teamwork, inter-professional skills and specifically sustainable concepts. The expanded interrelated objectives include:

- 1) Build IIT brand awareness and campus visibility in ways that are aesthetically pleasing, exciting and memorable.
- 2) Create an eco-friendly, self-sustained project that promotes general awareness of activities within the university among students, staff, faculty and the community.
- 3) Play a leadership role in supporting Mayor Daley's vision for creating a green Chicago by 2020.
- 4) Create an IIT campus sustainability plan for future IPROs to build upon.

The creative solutions developed through this IPRO to unify IIT and enhance visibility were an interactive campus-wide themed experience promoting the visibility of the IIT Main Campus using sustainable technology solutions.

## 2.0 Background

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IIT has a rich history in innovation, problem solving and implementation by portraying itself as a center of sustainability education, research and project implementation for the Chicago metropolitan area and beyond. IIT graduates are known for their ability to accept responsible roles in the work force create technology companies and assume technology roles in established companies.

There are multiple ongoing construction projects that are greatly reducing the amount of energy consumed in the operation of the campus demonstrating IIT's move towards sustainability. A

circa 1900 steam system design is being replaced with high efficiency hot water boiler systems. Lighting systems have been upgraded over the past decade which resulted in significant energy savings for general building lighting. Outdated building automation control systems are being upgraded to more responsive systems. Metering improvements have been made over the years to identify the amount and location of steam usage. With the change to the hot water boiler decentralized system, utility gas meters throughout the campus will provide a more accurate picture of the fuel needed to operate each building or mini utility plant. Although these improvements have not been individually highlighted through the initial IPRO offering, the improvements remain as opportunities for future IPROs.

A primary consideration for this IPRO, was that ideas be backed up with a continuation of improvements that make the IIT more energy efficient, material efficient and labor efficient while striving towards sustainability. In addition, alterations in campus operations and the actions of students, professors and staff should create a more sustainable university environment. Beyond sustainability, an image enhancement are needed at the IIT main campus including.

- The edges or borders of the IIT campus are not defined.
- IIT needs to improve its appearance as a university campus. New visitors to the campus do not interpret the entire assemblage of buildings as a university campus.
- IIT needs to improve the package of neighborhood amenities to create a campus environment. IIT is a few minutes south of downtown Chicago, but have no immediate “campus town” amenities.

This IPRO developed an overall campus plan to address these issues and promote sustainability campus wide.

### **3.0 Purpose**

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The intent of the IPRO was to develop visual, 3 dimensional enhancements to the 120 acre IIT campus, portraying a message of what the university has done in the area of sustainability and future capabilities. . The overall ideals include:

- promote IIT’s dedication to sustainability
- increase public awareness of IIT
- create aesthetic appeal to campus
- generate student created projects
- initiate technology advancements in green technology
- increase sense of community
- build tradition among students

## 4.0 Research Methodology

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The Team developed visual enhancements that represent the rich history of the university while keeping in mind the goal to attract positive attention to the IIT. Ultimately, we want to attract the best and brightest to the campus both in student body, professors and staff. We want to create an environment that inspires creative technological thought and research and benefits the status of the IIT. The IIT has had recent success through construction of the Campus Center and State Street Student Village. These new buildings have attracted attention from the design community, attracted architectural students and improved the overall appearance of some of the 120 acre campus. The design solutions developed through this IPRO have the potential of creating another layer of interest in the IIT while portraying a rich history in technology that can change the world.

- A. Conceptual design and development of a site plan, in the form of a digital model, to demonstrate the overall green plan for the campus. Signage was included as a design element.
- B. In order to develop the conceptual model described in part A, the team researched various green elements and sustainable concepts. Through the brainstorming sessions with Disney Imagineering, there was an opportunity to evaluate the campus issues from a new perspective. The team explored six ideas including:
  - CTA/Metra (transportation): Focused on enhancing the main transportation lines into and out of campus.
  - Reusable Billboards: Researched the current use of reusable billboards and develop a potential campus strategy
  - Recycling Technologies: Identified sources of materials for recycling throughout campus as well as identify potential materials to assist each sub group.
  - Green Technologies: Researched green technologies to develop a general campus strategy to improve the sustainability of the campus.
  - Temporary Exhibit: Developed ideas for potential student temporary exhibits of a sustainable nature to be placed throughout the campus.
- C. In the last stage of the IPRO, the groups developed concepts into a presentable master plan to rally support for campus development. The digital model was enhanced to incorporate a three dimensional animation/video through the campus identifying all aspects of the master plan and illustrating the importance of this development.
- D. Sub-teams carefully documented research and posted it to IGROUPS so that the information is readily available to all members of the team. Pictures were also taken and all notes will be posted to IGROUPS.
- E. IPRO deliverable reports were headed by two individuals from the IPRO team and as needed, those two will summon help from other IPRO team members to help with the IPRO deliverables. All who are responsible for parts then uploaded their parts to

IGROUPS and the two leaders of the IPRO deliverable reports combined all parts, revise, and upload a final version to IGROUPS for all team members to review before final submission. This was the protocol for all IPRO deliverable reports.

- F. At the end of the semester the sub-groups collectively came together to have all aspects of the subgroups be represented in the concept of **Green**installations. The team produced an interactive map of campus with the **Green**installations implemented throughout campus. Additionally, a rough three dimensional animation of campus allows a visual perspective.

## 5.0 Assignments

Name	Role	Major	Skills
Steve Bird	Minute Keeper / Leader Recycling	Political Science	Researching; Organizing
Migun Choi	Researcher / Leader Billboards	Industrial Technology and Management	Researching; Technology exploration; Microsoft Office; Photoshop
Brian Crowley	Researcher / Leader Greening	Civil Engineering	Researching; Technology exploration; AutoCAD
Brianna Elg	Researcher / Leader Temp. Exhibits	Psychology; Pre-Med	Researching; Technology exploration; Writing; Microsoft Office
Steve Henry	Researcher / Leader Paving/Lighting	Architecture	AutoCAD, Photoshop, Illustrator, Sketch-Up, Model Making, Computer Drawing
Josh Horwath	Researcher / Leader Transportation	Electrical & Computer Engineering	Researching; Technology exploration
Rae Mindock	Sustainability Consultant	Business	Sustainable technology applications
Anne Nadler	Researcher / Leader Transportation	Mechanical Engineering	Researching; Technical Solving; Organizing.
Jon Navarro	Project Manager	Architecture	AutoCAD, Photoshop, Illustrator, Sketch-Up, Model Making, Computer Drawing
Nick Perry	Model Master	Architecture	AutoCAD, Photoshop, Illustrator, Sketch-Up, Model Making, Computer Drawing
Brian Romanelli	Project Manager	Architecture	AutoCAD, Photoshop, Illustrator, Sketch-Up, Model Making, Computer Drawing

<b>Name</b>	<b>Topic</b>
Steve Bird	Recycling Technologies
Migun Choi	Reusable Billboards
Brian Crowley	Greening/Lighting/Paving
Brianna Elg	Temporary Exhibits
Steve Henry	Greening/Lighting/Paving
Josh Horwath	CTA/Metra
Rae Mindock	Floater
Anne Nadler	CTA/Metra
Jon Navarro	Floater
Nick Perry	Model/Interactive Map Design
Brian Romanelli	Floater

- A. Assign Meeting Roles
- Minute Taker: Steve Bird
  - Agenda Maker: Brian Romanelli and Jon Navarro
- B. Assign Status Roles
- Weekly Timesheet Collector/Summarizer: None. The group accepted the responsibilities to implement the project moving smoothly and did not use timesheets. The two project managers tracked progress of the subgroups and update the team through project completion.
- C. Master Schedule Maker: Brian Romanelli and Jon Navarro
- D. iGroups: Brian Romanelli and Jon Navarro

## 6.0 Obstacles

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The primary obstacle for the IPRO was conceptualizing the overall idea and visualizing it into the form of a site plan. The first challenge was defining the scope of the IPRO and developing the conceptual model. The stated objective was to create a more eco-friendly branding for the IIT campus, which includes infinite possibilities. To solve this problem, the team engaged in multiple brainstorming sessions, including several sessions with Disney Imagineering to develop the direction for the IPRO.

Another challenge encountered was inter-group communication. Each sub-group was responsible to complete individual's tasks which were interrelated to the other groups. Consequently, the need for effective communication between the groups was identified almost immediately. However, judicious use of iGroups and weekly meetings designed specifically to update the progress of each group were proven to be effective counter measures to the communication problem.

## 7.0 Results

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### GREENSTALLATIONS

Greenstallations are student-designed, student-built installation projects promoting innovations in sustainable design and technology at IIT. Green technologies developed here at IIT by our students and faculty shaping the way the world will live in the future. The Greenstallations project will be anchored with the development of a branch of "Eco-IPROs" which would allow an IIT professor to select sustainable design problem for students to solve that promotes the concept of sustainability. The final result of the project will include the physical construction of a Greenstallations exhibit to be placed on campus. The aim of Greenstallations is to create a "buzz" in the energy and sustainability community that establishes IIT as a leader in sustainable innovation and gets the IIT community to support a sustainable initiative.

### GREENSTALLATION KIOSK

An interactive, informational kiosk will be placed in the visitor center of the MTCC. The user will be able to navigate the interactive map to learn about each Greenstallation and its innovative efforts toward sustainability. The kiosk in the visitor center is a starting point for a self-guided tour of Greenstallations strewn throughout campus.

### GREENSTALLATION EXHIBITS

Each Greenstallation is a unique project created by students to showcase an innovative design of a green technology. Each project team composed of IIT students and faculty will be responsible for the design and construction of the Greenstallation exhibits to be placed in locations on campus relevant to the project. Greenstallation project teams can essentially become a branch of Eco-IPROs that are developing applicable projects to fit the objectives of Greenstallations. Each Greenstallation location will be identified with a Greenstallations sign to visually portray each project as an array of interconnected exhibits belonging to the Greenstallations infrastructure. The sign will also provide a description of the Greenstallations and the details of the project itself.

IPRO 311 has designed and developed the following concepts for possible Greenstallations:

1. Solar powered workstations

These Workstations are an excellent way for students and faculty to enjoy the landscaping and wonderful weather in spring, summer and fall. Designed as a stationary table, seating varying from 6-10, Solar Powered Workstations provide energy for users to charge electronics and enough space to study or have a meeting comfortably outdoors. By providing shade for the comfort of working and sitting outside without sun shining down, this shade canopy duals as the source of energy. Solar panels atop the shade canopy collect and store enough energy for 10

laptop users to work at the station. These stations are unique to IIT; being developed by IIT affiliated students and staff.

2. Energy Gauge

The consumption of energy is important to IIT. Energy Gauges in academic and residential buildings promote awareness around campus. These gauges allow students and faculty to monitor their buildings energy daily, conveniently located at the main entrances of buildings. Specifically, the energy gauges will show that daily's use compared to previous years usage and at what usage it should be in the future. To engage its viewer's real time news, weather, stocks and sports updates accompany the energy use. The gage is a flat screen TV panel that has backlights. These lights change color to acknowledge the energy consumption: green for below the average energy usage and red for above the energy usage.

3. Powerstallation

This sculpture represents the various forms of natural energy collection that promotes sustainability and energy efficiency. Solar panels and wind turbines are artistically designed to collectively make one common energy collector. All energy collected is fed into the IIT energy system to reduce energy usage around campus.

4. Permeable Paving

These paving's aid the campus maintain and appearance in providing better drainage system for campus streets and sidewalks. These permeable pavings are located throughout campus, specifically on main sideways and fire lane roads. The permeable pavers were created in the collaboration with an IIT IPRO that constructed permeable pavers. The purpose is to slowly collect and drain the water into the ground below.

## 8.0 Recommendations

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The continuation of this IPRO will need to consist of detailed planning of the Greenstallations discussed including collection of proper materials and cost of materials to construct. Future student teams will continue to bring in external points-of-view to stretch their imaginations. In addition, teams will strive to integrate new products on the market today within Greenstallations. This offers the potential of inviting various organizations to sponsor materials and advertise the Greenstallation after its exhibition. The aim of Greenstallations is to create a "buzz" in the energy and sustainability community that establishes IIT as a leader in sustainable innovation. The Greenstallations methodology is as an ongoing learning, explorative, and demonstrative process focused on sustainability that actively engages the entire IIT community and those who visit our campus.

Furthermore, it is necessary to provide the future team's financial aid to allow these projects to be put into action. Multiple resources including research grants and developing relationships with local in the area to sponsor the various projects proposed.



## 9.0 References

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## 10.0 Acknowledgements

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1. Disney Imagineers, California: Provided brainstorming sessions and design concepts for campus to improve sustainability.
2. Nancy Hamill, IPRO Professor: Provided numerous contacts and information about past and current IIT sustainability and design plans.
3. Rae Mindock, IPRO Consultant: Provided consultation on sustainability applications
4. IPRO 312- Permeable Paving: Provided research and design concepts for permeable paving to be place on sidewalks on campus.
5. IPRO 307- Wind Turbine: Provided research in design of wind turbines to collect energy and supply campus with the energy collected.

6. I PRO 334- Consumption Awareness in the Home: Spring 2007, Prof. Thomas McLeish: Information and research about the energy gauges. Research of existing devices and products on the market that measure consumption and provide feedback.
7. IIT Library: discussed Solar Powered Workstations around campus and outside the library.
8. George Nassos, IIT Professor: provided advice and resources for Solar Powered Workstations, natural energy collection and other ways to improved sustainability on campus.