

WASTE = FOOD

IPRO 326 – A Greener IIT: Creating a Self-Sustainable Urban Campus Ecosystem

Faculty Advisor: Professor Blake Davis, ITM
 Team Leaders: Irina Papuc and Ryan Roeth

Team Members: Ying Xiao, Julie Masci, Kyle Duke, Trevor O’Keefe, Naguib Azab, Mitch Blosky, Jonathan Skinner, John Stecyk, Tryphaena Manoharan, Edgar Rodriguez, Ryan Roeth, Irina Papuc

ABOUT THE TEAM

TEAM MEMBER	STRENGTHS	WEAKNESSES	KNOWLEDGE/SKILLS TO DEVELOP	PROJECT EXPECTATIONS
YING XIAO	Communication, problem-solving, time management, AutoCAD, MathCAD, Photoshop, Microsoft Office	Coding/programming, Lack of landscaping knowledge	Project management	Gain teamwork experience and develop possible plans for a greener IIT
JULIE MASCI				
KYLE DUKE	AutoCAD, Revit, 3ds Max, Rhino, Grasshopper	Web design, coding, programming	Gain a better understanding of permaculture and learn more about native plants to Illinois	Develop a landscaping plan that is economically feasible and submit it to IIT for consideration and implementation
TREVOR O’KEEFE				
NAGUIB AZAB	Technical drawing in cad programs, Adobe design suite, Microsoft office, code and zoning	Communication, basic landscape principles	Communication, basic landscape principles	Real experience in sustainable design, contributing to the development of the IIT campus.
MITCH BLOSKY				
JONATHAN SKINNER	CAD, Photoshop, Illustrator, Web, Design, Sustainability Forums, Punctual Team player	Landscape knowledge	Landscape knowledge	To design a mostly self-sustainable landscape that is accepted by IIT

JOHN STECYK				
TRYPHAENA MANOHARAN				
EDGAR RODRIGUEZ	Problem-solving, communication, dedication to teamwork, architecture knowledge, some sustainability knowledge, AutoCAD, Rhino, Photoshop, Illustrator, Microsoft	Lack of knowledge in landscape design	Strong teamwork collaborative skills/management Knowledge of landscape and sustainability design	Development and proposal for realistic plans for beautiful and self-sustainable IIT landscape
RYAN ROETH	Research skills, chemistry knowledge	Communication	Communication	A sustainable landscape plan
IRINA PAPUC	Research skills, scientific method, part of the IPRO's vision	Not a natural leader	Working knowledge of local plants and their uses, Permaculture	Apply Cradle to Cradle principles to the IIT Landscape, if only in theory

DESIGNATION OF ROLES

BLOG MASTER.....	Jon Skinner
FACEBOOK PAGE MASTER.....	Mitch Blosky
IGROUPS MODERATOR.....	Ying Xiao
MINUTES TAKER.....	Ryan Roeth
AGENDA MAKER.....	Irina Papuc
TIME KEEPER.....	Jon Skinner
PLANTS SUBTEAM LEADER.....	John Stecyk
PROBLEMS SUBTEAM LEADER.....	Mitch Blosky
SOLUTIONS SUBTEAM LEADER.....	Ryan Roeth
PLANT SUBTEAM BINDER ORGANIZER.....	Julie Masci
PROBLEMS SUBTEAM BINDER ORGANIZER.	Naguib Azab
PROBLEMS SUBTEAM BINDER ORGANIZER.	Edgar Rodriguez

PURPOSE STATEMENT

IIT's core vision is built around the principle that no matter how good we get, we can always improve. As the University seeks to assert itself as a member of the top tier of academic institutions in the U.S., there are many ideas for improvement up for implementation. Among these ideas is the goal to make IIT the most sustainable, urban university campus in the United States. IPRO 326 ("A Greener IIT") is based upon the idea that in order to accomplish this, we must improve the sustainability of IIT's main campus landscape.

An asset to IIT's reputation is its beautiful, lush urban campus. However, the University's landscape plan and practices have not been assessed for their sustainability attributes since the announcement of efforts to make the campus more eco-friendly. IPRO 326 seeks to take advantage of this opportunity to identify possible changes to the IIT landscape that can ultimately make it a self-sustainable urban ecosystem. Our philosophy is that a landscape can and should be beautiful, ecologically sustainable, and cost-effective. The purpose of the IPRO is thus to (1) determine the current landscape's level of self-sustainability, and (2) determine ways to improve.

OBJECTIVES

1. Identify problems with the current landscape design and maintenance that make it expensive, ecologically unsustainable and/or unhealthy, using data from similar universities as a benchmark.
2. Compile a list of local plant, climate, soil, and wildlife data.
3. Research and identify solutions to the problems (both anticipated and confirmed).
4. Compile a report of short- and long- term solutions to landscape problems to be presented to the Storm water / Landscape Action plan group at the end of March for integration into IIT's Campus Sustainability Plan.
- 5.
6. Maintain an open dialog with the IIT Office of Campus Energy and Sustainability and Landscape/Storm water management action plan group throughout the project.
7. Work effectively and efficiently as a team to accomplish these goals.

BACKGROUND

SPONSOR INFORMATION

IPRO 326 is sponsored by the IIT Office of Campus Energy and Sustainability (OCES). The office was established to act as the facilitator of sustainable policies, projects and initiatives across IIT's academic, administrative, and operational departments, and to oversee the implementation of these strategies in the short- and long-term as part of the University's Strategic Plan. So far, OCES has managed the implementation of a recycling program at IIT and has established monthly Sustainability Forums for the university community at which members of the community can receive information and give feedback about sustainability programs and progress on campus. The ultimate goal is contained in the office's motto, "IIT will become the most sustainable, urban university campus in the United States."

OCES will define the responsibilities for sustainability of each component of the University in the IIT Campus Sustainability Plan, to be released on April 11, 2010. This plan is being compiled by the efforts of the Campus Sustainability Action Plan groups, which are broken down according to the specific issues being addressed. In particular, IPRO 326 will function as a subset of the Storm Water/Landscape Action Plan group, which seeks to create a plan for a sustainable campus landscape and eventual storm water management to restore IIT's main campus to a level of vitality ascertained by its social,

economic, and ecological impacts and benchmarked by clearly defined standards of optimal performance in these areas.

ANTICIPATED SCIENCE AND TECHNOLOGY

The ideas and philosophy contained in the book Cradle to Cradle by William McDonough and Michael Braungart are the inspiration for this project. The book presents a new approach to design that considers the life cycles of materials beyond the life span of any particular product or service employing them, with the ultimate goals of sustainability (through the elimination of the concept of waste by design) and socioeconomic health. We plan to use these ideas in our landscape plan.

Accomplishing this task will require analysis of the current system and possible solutions using methods and data from various areas of the biological/chemical sciences and engineering, including botany, soil chemistry, climatology/meteorology, civil engineering, etc. Additionally, we will be utilizing data resources and methodologies from the field of landscape architecture.

In addition to approaching landscape design with the scientific method, Permaculture principles and zone 6-7 case studies will aid us in choosing the right plants for the given climatological conditions.

HISTORY/PRECEDENCE

There are isolated examples of attempts at self-sustainable design at IIT, such as a partially successful effort to prevent flooding and erosion in front of the SSV student dormitories by installing pavers and drainage.

Permaculture design practices have been applied on a home and agricultural scale, and we will explore case studies of successes and failures in detail. We will also research other college campus that have adopted more self-sustainable design, or that are also currently researching how this can be accomplished.

ETHICAL ISSUES

An important feature of IIT's reputation is the legacy of its main campus, the original landscape design of which was created by the well-known landscape architect Alfred Caldwell. However, it is possible and even likely that the plan resulting from this IPRO will not stay true to Caldwell's design. Thus, it is a reasonable estimate that the team will be confronted with the issue of how to incorporate IIT's legacy into the plan without compromising the outlined goals for this project (offer suggestions for how to improve the current landscape plan).

BUSINESS OR SOCIETAL PROBLEM COSTS

As the implementation outline below explains, the results from the second category could cover infrastructure change, and this carries a significant start-up cost. Detailed cost breakdown will accompany the final results.

IMPLEMENTATION OUTLINE

We anticipate that the results of the project will be in two main categories: (1) those results that can be immediately implemented and (2) those that are long-term solutions because of factors such as economic cost and/or logistical difficulties of implementation. Considering this, it is a reasonable guess that results in group (1) will consist of most (if not all) of the landscape plan pertaining to surface issues such as vegetation and drainage, while group (2) will consist of more complicated and (perhaps) expensive issues below the surface, such as the installation or replacement of infrastructure. In addition to this, we anticipate that group (2) of the results will include a subset of recommendations as to further projects and/or research to be carried out in the future. We expect that this subgroup will pertain to issues beyond our current project scope (for reasons such as time or other constraints), such as purification and/or retention of storm water runoff and other effluents from campus.

RESEARCH

The research can be broken down into several clusters, outlined in the attached mind maps and organized by sub-team (Ecology, Present, Future).

TEAM VALUES STATEMENT

A. Desired Behaviors:

- Attendance and active participation in all class meetings
- Successful completion of individual assigned tasks
- Clear communication as to time/schedule conflicts
- Maintaining well organized and coordinated team planning

B. Addressing problems:

- Problems should be communicated in class or via email to the project leaders or Professor Davis

WORK BREAKDOWN STRUCTURE

RESEARCH (FEBRUARY – EARLY MARCH)

Break up into three sub-teams: Ecology, Equity/Economy (Present), and Equity/Economy (Future). Ecology gathers information on existing and possible future flora, soil data, pollution data, and Midwestern climate conditions. The present group identifies all the problem areas as related to economic and social concerns. This involves gathering student body/ faculty/ administrative input through surveys, researching the current infrastructure and its performance, and gathering statistics on the Brickman contract and IIT Facilities. The future group brainstorms potential solutions to the problems found by the ecology and present groups.

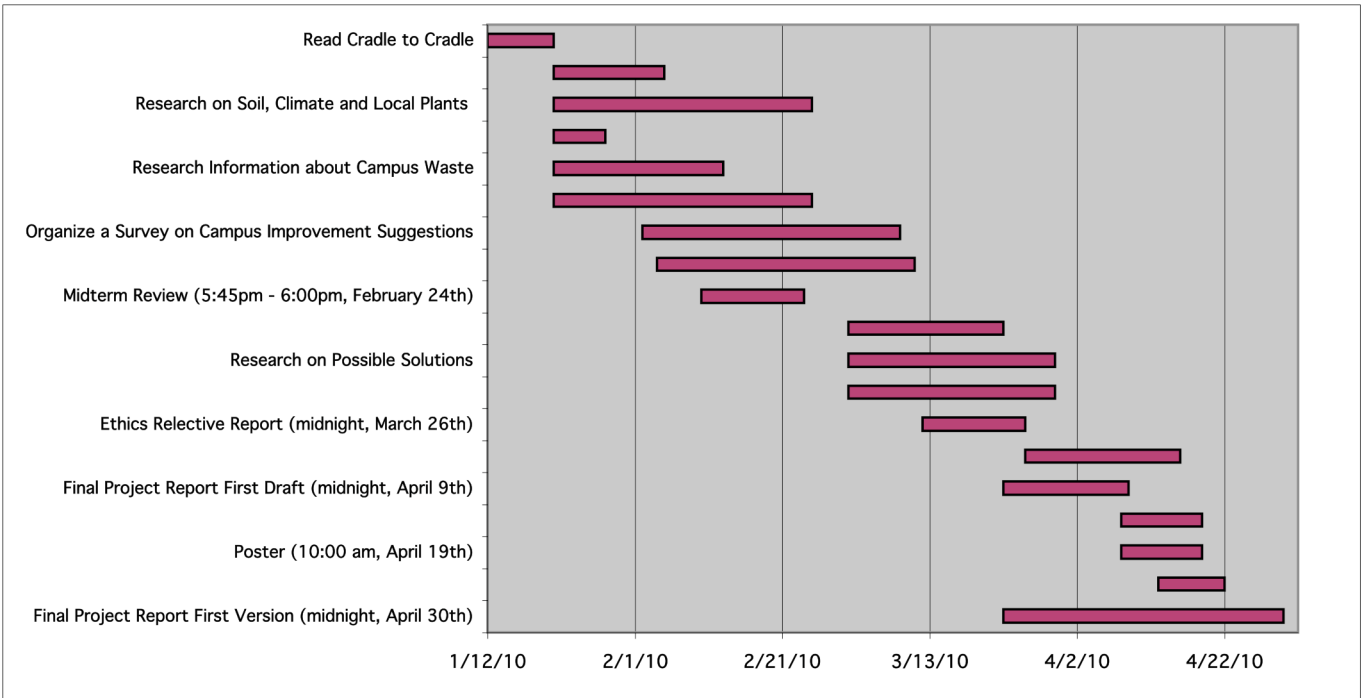
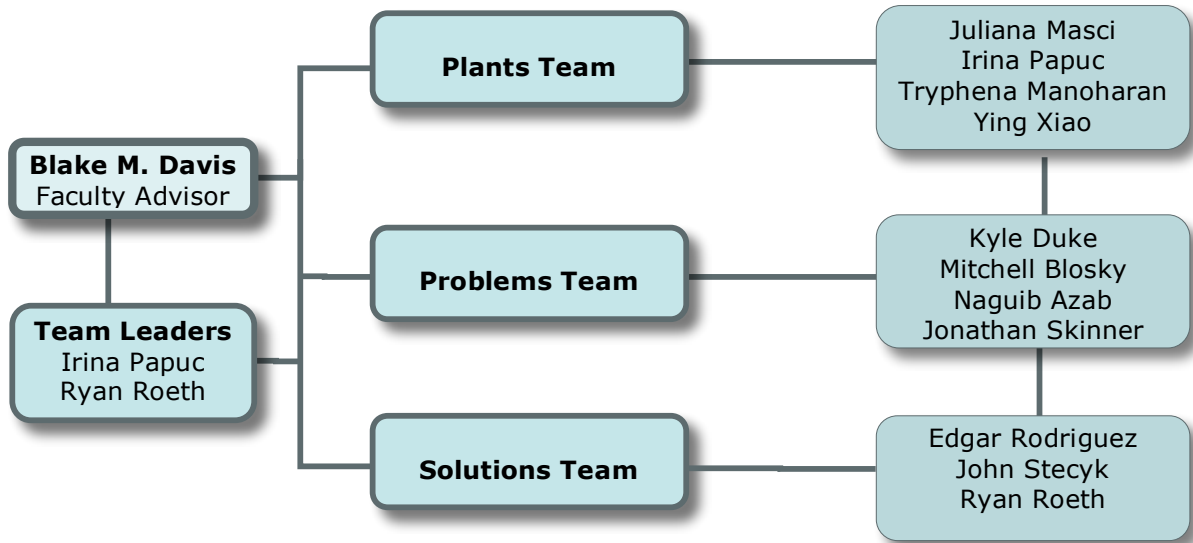
BRAINSTORMING SOLUTIONS (MARCH)

The ecology and present groups merge with the future team to brainstorm various solutions to the various problems from an ecological, economic, and social perspective.

IMPLEMENTING/INTEGRATING/PRESENTING SOLUTIONS (LATE MARCH - APRIL)

At the end of March IPRO 326 will present the Office of Campus and Energy Sustainability Action Plan Group with a detailed report of possible solutions to integrate into the April

11 Landscape plan. At the end of the semester a full, formalized report will be presented including all the work after the end of March.



EXPECTED RESULTS

Working with the IIT Office of Campus Energy & Sustainability, our aim is to provide two potential solutions for creating a more sustainable, eco-friendly, and beautiful landscaping plan for the IIT campus. Below are the expected results we aim to achieve.

Through an analysis of the campus' current landscape practices, an inventory of existing vegetation, and data from soil tests, we will identify the following:

- Area's of poor soil conditions and drainage
- Area's where salt contamination is an issue
- "Desire lines" or paths around campus that are not paved but created by people taking shortcuts across grass
- Plants that are not native and/or may present the potential to become invasive
- Locations of annuals and perennials

DELIVERABLES

- A compilation of student and faculty survey data which will highlight area's of concern and a proposal for remediation of these problem area's and concerns
- Landscape plans along with recommended species lists
- Identification and recommendations for implementing permaculture practices on campus
- Maintenance plans for each proposed solution
- A phasing plan
- Recommendations for removal of any unhealthy or exotic plants or trees

Potential obstacles to project success

- Budget and scope of project
- Striking an appropriate balance between the history of the campus with an innovative a forward-thinking approach to the landscape
- A need for public understanding of how important plants are for a truly green and sustainable campus ecology
- Potentially disruptive work on irrigation and storm water systems

Realizing that a phased plan will take some time to develop and grow (literally) we need to ensure that there will be persons on campus that will continue to manage and work towards the goals we outline. We will provide a phasing timeline which will outline when, where and how our recommended changes to the landscape should be implemented.

Our solutions will serve to beautify the campus, help manage storm water, enrich the soil, provide food, reduce the amount of fertilizers and chemicals used, create a "living lab" for education and research, and keep the history of the IIT campus intact.

PROJECT BUDGET

POTENTIAL EXPENDITURES:

Item	Description	Quantity	Price/unit
Soil test kits	K, Ni, P detection	5-10	~\$15.00
Salt test kits	Test for salt	5-10	~\$25.00
Plant samples	Test out plants	?	Varies
Field Trips	Educational outings	~5	Transportation (meta, bus?)
Binders, notebooks	Organize documents	3	~\$20.00 (IPRO office)
Print jobs	Print out data	A lot	~\$50.00
Survey posts	Hold surveys	8	\$114.00