

# Orthotics and Prosthetics in Latin America

## IPRO 309 – Fall 2010 Project Plan

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### H.O.P.E.

Helping in Orthopedic and Prosthetic Education  
“Ayudamos a nuestros amigos, paso a paso.”

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## 1.0 BACKGROUND

The importance of education and health care go hand in hand. These two issues are persistent problems in health care provision across Latin America, where health care policy is a key issue in the region's political economy. The most compelling point is that despite waves of reform, especially in the recent 1990s, public health spending in Latin America has been and continues to be regressive. Even today, there exists a strong demand for orthotics and prosthetics in Latin America, where more than 2.5 million people are in need of such medical care. Despite the vast demand for orthotics and prosthetics, Latin America consists of only 50 certified and 1,500 uncertified O & P practitioners.

IPRO 309 has been the longest running, non-funded IPRO at IIT. This IPRO first came into the curriculum in the spring semester of 2006. During this time, its first students came into the course hoping to make the care of orthotics and prosthetics more readily available to the people of Latin America. Only a few years later in October 2004, Centro Don Bosco (Bogotá, Colombia), Don Bosco University (San Salvador, El Salvador), and the Laboratorio Gilete (Bogotá, Colombia) would sign an agreement to establish the first accredited O & P education program in Colombia.

According to the developed ISPO (International Society of Prosthetics and Orthotics) standards, there are three levels of accreditation. The ISPO developed a category system that would be based on the levels of education and training provided, avoiding dependence on titles. The first level is Category III: prosthetic/orthotic technician (or equivalent term). This level of training consists of on-site training if an elementary school diploma is held. Here, design and manufacturing of O & P products are considered. The next level of training is Category II: orthopedic technologist (or equivalent term). The education relating to Category II consists of 3 years of formal training instead of the 11 years of schooling normally required. Skills relating to patient care and the fabrication of devices are expanded within this category. The last level of training is Category I: prosthetist/orthotist (or equivalent term). This level of training consists of 3 to 4 years of formal training which equates to a university degree. This curriculum is much faster compared to the average 12 to 13 years of schooling for an equivalent degree. Topics studied in this category include production, treatment for patients, research, and development. In equivalency to ISPO, the United States of America has the ABC (American Board of Certification in Orthotics and Prosthetics). Since they are independent from one another, it is vital that ABC standards reflect those in the ISPO, so that there is medical transparency between cross cultural and national boundaries.

Classes first opened at Centro Don Bosco in Bogotá, Colombia in February 2005 with 17 students. Over the years, there has been much advancement in Category III accreditation. The institution hopes to expand its education to include a higher category of accreditation. Although there are only 17 students, their impact will be immense. With each person being able to make over 250 orthopedic and prosthetic devices each year for a span of 25 to 30 years, the number of altered lives is indescribable. With the help of IPRO 309, we can help quicken this process by developing a curriculum that the students can follow and helping to provide basic educational material to those students interested in the program. Many of us have heard the phrase: "It only takes one person to take a stand and the rest will follow." In addition to our school (IIT), several other well-known institutions have joined us to provide education and assistance in this project. These institutions include:

- Universidad de los Andes; Bogotá, Colombia
- La Escuela Colombiana de Rehabilitación; Bogotá, Colombia
- Centro Don Bosco; Bogotá, Colombia
- Laboratorio Gilete; Bogotá, Colombia
- Bioconcepts, Inc.; Burr Ridge, IL
- Dynamic Orthotics and Prosthetics; Houston, TX
- Children's Memorial Hospital; Chicago, IL
- Joliet Junior College; Joliet, IL
- Northwestern University Prosthetics and Orthotics Center; Chicago, IL

## **2.0 OBJECTIVES**

The overall goal of our IPRO team is to create a curriculum and a program that helps all practitioners and employees better understand how to utilize and build upon their knowledge and talents in the medical work setting. This will be achieved by promoting the awareness of treatments available, organizing demonstrations and lectures to help educate others, developing a course load for an accredited student. By achieving the aforementioned, our IPRO team hopes to increase the availability of funding to help create public awareness as well as to increase the quality and durability of the products we produce. In addition, we hope to expand on the QR Code invented by the Japanese. With this invention, we hope to develop a low cost solution for developing nations to be able to have quick and easy access to maintenance instructions, use instructions, and contact information of medical professionals. With the QR Code, we hope that potential problems will be able to be solved on site, wherever one may be.

## **3.0 TEAM VALUES STATEMENT**

It is expected that all members of IPRO 309 will take an active role within the group. All members will respect their team by coming to meetings and class sessions on time, preparing themselves with the appropriate materials, and being ready for productivity. Members of the group will be respectful of their teammates and conduct themselves in a professional manner. This includes attentive listening and active participation. Each member of this team has an obligation to share any and all feedback in an honest and constructive manner. Finally, it is expected that if any team member cannot fully participate in the group due to extenuating circumstances, they will give notification to the group as soon as possible.

## **4.0 METHODOLOGY, EXPECTED RESULTS, AND RESEARCH**

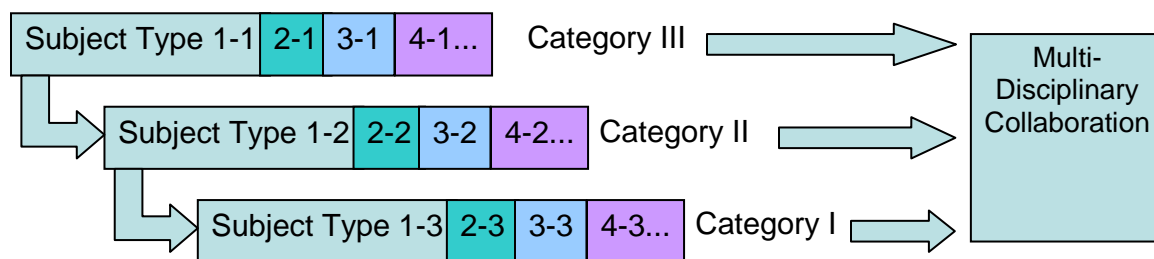
### **4.1 METHODOLOGIES**

The IPRO team will develop and propose educational curricula for Categories I, II, and III O&P professions while emphasizing vertical integration and multi-disciplinary teamwork. To do so, the IPRO team will first review the following: core curriculums for orthotists and prosthetists developed by NCOPE (National Commission on Orthotic and Prosthetic Education), professional profiles, and learning objectives for each category of profession previously established by ISPO (International Society of Prosthetics and Orthotics). This project will not only expand upon the many works completed in the previous semesters, but it will also provide an opportunity for the team to emphasize the latest O&P technologies

and research, conduct comparative effectiveness research, and incorporate evidence-based practices into the O&P curriculum.

To accomplish this mission, the IPRO team will research and understand the aforementioned, and consolidate them into a distinct educational curriculum that covers Category I, II, and III curricula. To do so, the team will identify specific courses, training programs, textbooks, and entry transitions for each new category. The team will also attempt to incorporate the latest technologies into the curriculum, demonstrating to O&P students how to utilize technology to manage the patient care process. An example of such technology is the QR (Quick Response) code, which can be used to enhance the communication of patient data between practitioners, and educate patients by providing instructions for O&P usage.

Furthermore, each curriculum will have an emphasis in vertical integration, where students from each category of profession can enter into the curricula of another mutual profession. This would allow the student to build upon each subject of knowledge he or she previously learned. The vertical integration curriculum is presented in the following diagram:



**Figure 4.1: Idealized O&P Curriculum Flow Chart**

At the conclusion of each curriculum, the IPRO team will attempt to promote cooperation and understanding among the three categories by developing a team project at the end of each curriculum. To graduate from each specific category of profession, students of O&P will be expected to participate in a multi-disciplinary activity at the end of the year involving Category I, II, and III students. This final completed curricula layout will be presented as an educational proposal for O&P schools in Colombia and the United States, as well as be uploaded to the internet for ease of access.

Upon drafting this first curriculum plan, the IPRO team will evaluate it against accreditation requirements established by both NCOPE and ISPO. Simultaneously, the IPRO team will seek critique from a number of professions and organizations. These sources of critique may include BioConcepts, Joliet Junior College, Centro Don Bosco University (Bogotá, Colombia), and Children's Memorial Hospital. The team will revise the curriculum as advised and begin proposing it to O&P schools. Because of the strong need for certified and capable O&P practitioners, especially in Latin America, this team will strive to complete this project within this semester.

The IPRO team has assembled three subgroups. Each subgroup is responsible for researching and documenting new technologies and professional profiles pertinent to each category of profession:

- Category I – Prosthetists/Orthotists
- Category II – Orthopaedic Technologists
- Category III – Prosthetics/Orthotics Technicians

Each subgroup consists of four individuals of diverse educational backgrounds. Each subgroup is expected to meet often outside of the regular class schedule and bring developed materials during regular class meetings to share with other subgroups. The class meeting will serve as an environment for integrating materials gathered from each subgroup (Detailed team structure and personal responsibilities are shown in section six).

## **4.2 EXPECTED RESULTS**

To create an acceptable and ISPO accredited curriculum, the team must research various forms of information. Since the team's focus is to develop a Category I curriculum (which is built on the foundation of Category II and III curriculum), information varying from prosthetic and orthotic fabrication processes, biomechanics, prosthetic and orthotic research, basic and advanced clinical knowledge (with respect to prosthetics and orthotics) must be researched. These sources can come from libraries, the internet, and discussions with people in the prosthetics and orthotics field (via field trips to BioConcepts, etc). By developing a potential four-year curriculum for a Category I Prosthetic and Orthotic Education, the curriculum can be reviewed by persons active in the field (such as the team's contacts in Bogotá, Colombia). Upon review, the curriculum can be further tailored for launch in the school systems around the world. In turn, this would allow more advanced medical care to be administered to people who need it the most.

## **4.3 RESEARCH**

The entire IPRO team will conduct preliminary research on the curricula of Categories I, II, and III. The main literature for this investigation will be NCOPE's (National Commission on Orthotic and Prosthetic Education) core curriculum<sup>1</sup>. Additionally, every team member will become familiar with the work and development of previous IPRO teams<sup>2</sup>. It is integral for this research to be universal in order for vertical integration among the three orthotics and prosthetics categories to work properly. Without having a common background, it will be extremely difficult for the subgroups to function.

Individually, the IPRO teams (separated by category) will undertake additional research. The Category III Subgroup will research the current progress of Category III technicians at Centro Don Bosco University, Colombia. The group will study effective ways for these technicians to work effectively and directly with Category II and I orthotists and prosthetists. The Category II Subgroup will focus on studying how Orthopedic Technologists could best facilitate the cooperation and work in a vertical integration system. Lastly, the Category III Subgroup will research how to best maximize the effectiveness of working orthotists and prosthetists' practices in the cooperative work environment this IPRO team is developing.

1. 1. NCOPE 2010 Core Curriculum, < [http://www.ncope.org/assets/pdfs/core\\_guide\\_for\\_bs.pdf](http://www.ncope.org/assets/pdfs/core_guide_for_bs.pdf)>
2. Subsequent IPRO 309 Work, <igroups.iit.edu>

## 5.0 PROJECT BUDGET

Without a concrete amount of funds being appropriated to IPRO 309, the following is a breakdown of projected areas in which funds may be needed (ranked from most important to least).

ITEM	COST	PURPOSE
Prosthesis/ circuit parts ext.	\$500.00	Equipment for technical group.
Field Trips	\$450.00	To have a better knowledge of Orthotics and Prosthetics.
Photocopies/ Computer printing	\$200.00	Cost of surveys and IPRO Presentation materials.
<b>Total Budget:</b>	<b>\$1150</b>	

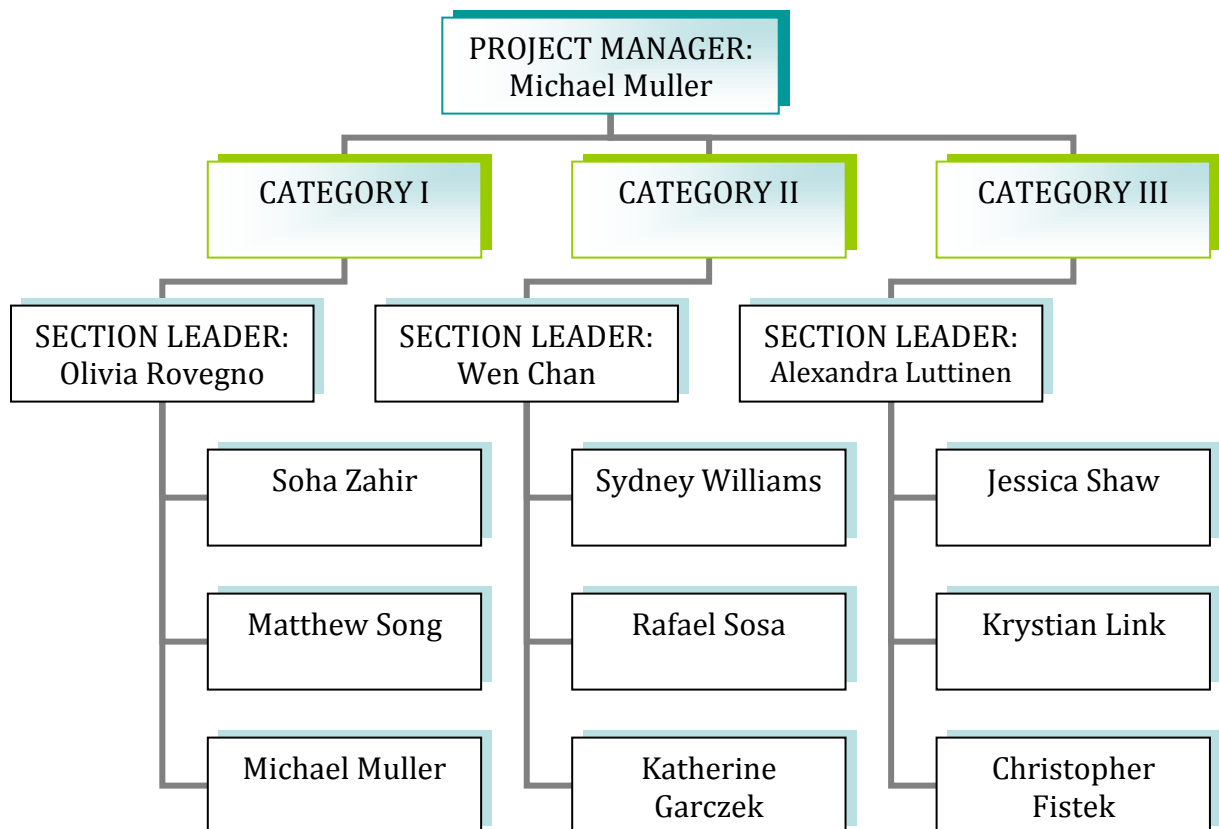
## 6.0 TEAM STRUCTURE AND ASSIGNMENTS

Team Member	Skills	Learning Needs	Expectations
Chan, Wen	<ul style="list-style-type: none"> <li>-Previous experience in this IPRO</li> <li>-Good organizer, scheduler</li> <li>-Gets everyone involved</li> <li>-Completed capstone design courses (thermal systems and design of mechanical systems)</li> <li>-Practiced in ProE, SolidWorks, EES, and MATLAB</li> </ul>	<ul style="list-style-type: none"> <li>-Communication</li> <li>-Presentation skills</li> <li>-Learn more about medical treatment process</li> <li>-Learn about materials for fabrication</li> <li>-How an engineer can help as well as cut the financial cost</li> </ul>	<ul style="list-style-type: none"> <li>-Exposure to information on O&amp;P technologies</li> <li>-Opportunities to meet practicing professionals and see their projects</li> <li>-Determine if the field of prosthetics would be of interest for graduate study</li> </ul>
Fistek, Christopher	<ul style="list-style-type: none"> <li>-Knowledge of hand and power tools</li> <li>-Willing to learn</li> <li>-Past experience gave opportunity to hone skills in Microsoft tools, multi-tasking, and group communication</li> <li>-Photoshop</li> </ul>	<ul style="list-style-type: none"> <li>-Gain knowledge in the field of O&amp;P as well as medicine especially from the perspective of an engineer</li> <li>-Improve sense of visualization as opposed to simply doing</li> <li>-Continue to improve group work skills</li> </ul>	<ul style="list-style-type: none"> <li>-Learn more about the field of O&amp;P</li> <li>-Expand on previous semesters while contributing something tangible to it</li> <li>-Learn more about the IPRO system in general</li> </ul>
Garczek, Katherine	<ul style="list-style-type: none"> <li>-Communication within a group</li> <li>-Capability to handle and adapt to change</li> <li>-Ability to prioritize and organize</li> <li>-Knowledge of as well as experience within in the field of medicine</li> </ul>	<ul style="list-style-type: none"> <li>-Expand knowledge about thermoplastics</li> <li>-Collaborate with different ideas from the various majors</li> </ul>	<ul style="list-style-type: none"> <li>-Every group member is able to educate someone about O&amp;P's</li> <li>-Incorporate medicine into the IPRO</li> <li>-Organize demonstrations and lectures to educate others</li> </ul>
Link, Krystian	<ul style="list-style-type: none"> <li>-Diligent, driven worker</li> <li>-Enjoys socializing with others and being the "morale booster"</li> <li>-Creative and hands on</li> <li>-Experience in project management</li> </ul>	<ul style="list-style-type: none"> <li>-Understand the anatomy and how O&amp;Ps work</li> <li>-Learn about the body from an engineer's perspective</li> <li>-Expand knowledge on group project skills</li> </ul>	<ul style="list-style-type: none"> <li>-Learn about the body from the perspective of an engineer</li> <li>-Gain information about the field of O&amp;P</li> <li>-Obtain the ability to better help those in need of O&amp;Ps in the world</li> </ul>
Luttinen, Alexandra	<ul style="list-style-type: none"> <li>-SolidWorks</li> <li>-Excel</li> <li>-MATLAB</li> <li>-Auto CAD</li> </ul>	<ul style="list-style-type: none"> <li>-Gain knowledge of O&amp;Ps</li> <li>-Apply engineering to a more human based field</li> <li>-Create an effective timeline to accomplish a long-term task in the most efficient manner possible</li> </ul>	<ul style="list-style-type: none"> <li>-Learn something new about engineering and its applications in a more personal sector</li> <li>-Work well with a team</li> </ul>
Muller, Michael	<ul style="list-style-type: none"> <li>-Creative thinker</li> <li>-Motivated worker</li> <li>-Past exposure to working within a group as well as project management processes</li> <li>-Strong analytic skills</li> </ul>	<ul style="list-style-type: none"> <li>-Gain knowledge in the field of O&amp;P and the fabrication of O&amp;Ps</li> <li>-Learn more about the human body</li> <li>-Learn more about the materials used in O&amp;Ps</li> </ul>	<ul style="list-style-type: none"> <li>-Learn more about O&amp;Ps, specifically cybernetics</li> <li>-Meet professionals within the field and learn about recent developments in technology</li> <li>-Use own experiences and interests to further help improve the quality of this IPRO</li> </ul>
Rovegno, Olivia	<ul style="list-style-type: none"> <li>-Strong communicator and can transform abstract ideas in focused statements</li> <li>-Well versed in Microsoft Office</li> <li>-Extended exposure to the doctor-patient relationship via hospital volunteering</li> <li>-Motivated goal oriented worker</li> </ul>	<ul style="list-style-type: none"> <li>-Limited teaching experience</li> <li>-Learn more about how O&amp;Ps are created and applied</li> <li>-Observe the communication between IIT and the Colombian university, specifically the effectiveness of said conversations and frequency of them</li> </ul>	<ul style="list-style-type: none"> <li>-Produce a tangible result, ideally a unique contribution that builds on previous IPRO groups</li> <li>-The project will make a sincere difference in its community</li> </ul>
Shaw, Jessica	<ul style="list-style-type: none"> <li>-Previous experience in this IPRO</li> <li>-Lived in Bogota for 2 months and spent time at the Lab Gilete</li> <li>-Speaks some Spanish</li> </ul>	<ul style="list-style-type: none"> <li>-Knowledge of materials</li> <li>-Related medical information</li> <li>-Learn about the different types of O&amp;Ps</li> </ul>	<ul style="list-style-type: none"> <li>-Hands on learning as well as field trips</li> <li>-Focus on interpersonal relationships</li> <li>-Explore new research in the O&amp;P field</li> </ul>
Song, Matthew	<ul style="list-style-type: none"> <li>-Previous experience in this IPRO</li> <li>-Leadership skills</li> <li>-Experience in teaching and mentoring individuals</li> <li>-Motivating others to ensure project completion</li> </ul>	<ul style="list-style-type: none"> <li>-Finish tasks earlier before deadlines</li> <li>-Developing multitasking skills</li> <li>-Stick to an agenda</li> <li>-Develop skills in mechanical design</li> </ul>	<ul style="list-style-type: none"> <li>-Learn more about O&amp;Ps</li> <li>-Help those in developing nations make practical programs in the teaching and application of technologies</li> </ul>
Sosa, Rafael	<ul style="list-style-type: none"> <li>-Willingness to work, learn, and help</li> <li>-Respectful, responsible worker</li> <li>-Latin American background</li> </ul>	<ul style="list-style-type: none"> <li>-Develop teamwork and team communication skills</li> <li>-Gain a better understanding of the O&amp;Ps field</li> <li>-Developing research skills, specifically conducting research towards finding a solution to an existing problem</li> </ul>	<ul style="list-style-type: none"> <li>-Develop an educational program to expand the field of O&amp;Ps in Latin America as well as the United States</li> </ul>
Williams, Sydney	<ul style="list-style-type: none"> <li>-Experience in the field of biomedical engineering</li> <li>-Motivated worker</li> <li>-Respectful, responsible worker</li> </ul>	<ul style="list-style-type: none"> <li>-Gain experience in project-based courses such as this IPRO</li> <li>-Develop more of a voice in the group setting</li> </ul>	<ul style="list-style-type: none"> <li>-IPRO makes a tangible development this semester</li> <li>-Provide as much as possible to the Colombian community</li> </ul>
Zahir, Soha	<ul style="list-style-type: none"> <li>-Determined, respectful, responsible worker</li> <li>-Experience in the field of biology</li> <li>-Proficient in gathering information and determining what is relevant and most important</li> </ul>	<ul style="list-style-type: none"> <li>-Learn about the creation of prosthetics and the technology behind them</li> <li>-Better communication skills and self-confidence within a group</li> <li>-Gain knowledge about how biologists can help with O&amp;Ps</li> </ul>	<ul style="list-style-type: none"> <li>-Gain knowledge in the field of O&amp;P</li> <li>-Help others and gain a sense of community and service</li> <li>-Be exposed to professionals, researchers, and manufacturers in the O&amp;P field</li> </ul>



## 6.1 SUBGROUP DELIVERABLES AND RESPONSIBILITIES

The IPRO 309 team will present effective methods of public awareness. The team will provide extensive deliverables, such as a project plan, an abstract, a mid-term presentation, and a final report. However, aside from these critical aspects, the IPRO team will be creating posters, PowerPoint presentations, visual aids to present data, and a website or blog. To further extend this IPRO's knowledge, educational modules and workshops will be designed for others to view. To ensure that deadlines are met, each sub-group will regularly provide details and report back to the entire team regarding their accomplishments, research, and progress. Information collected will be consolidated and collaborated with the Centro Don Bosco University (Bogotá, Colombia) and the curricula for modification.



## **6.2 DESIGNATION OF ROLES**

**Minute Taker-** Records the discussion during any meetings, paying special attention to the following: decisions made, tasks that require work outside of class for completion, and timelines for all applicable notes.

**Agenda Maker-** Creates an agenda for each meeting to provide structure to the class meetings. Agendas should be emailed to the class by 10pm on the day before any class meeting to allow for idea preparation.

**Time Keeper-** Is responsible for making sure meetings go according to agenda. They should make sure too much time is not spent on any one agenda point while understanding that some of the best ideas may come from slight diversions from topic. They are responsible for deciding the validity of such deviations from the agenda.

**iGroups Moderator-** Is responsible for organizing the team's iGroups account and updating it regularly. They should make sure the Agenda Maker posts the current agenda and the Minute Taker posts meeting minutes in a timely manner.

**Project Manager-** The Project Manager is responsible for the coordination of all parts of the project. They should be in regular contact with the Subgroup Leaders and have the overall goals of the project in mind. They will make sure all Subgroups are contributing to the completion of the project in a consistent way.

**Subgroup Leaders (Category I, II, III)-** The team will consist of three subgroups corresponding to the three ISPO Categories. Each subgroup will have a leader. Each of these leaders will be responsible for coordinating the work of their subgroup as it relates to the requirements of their category and the curriculum for Category I.

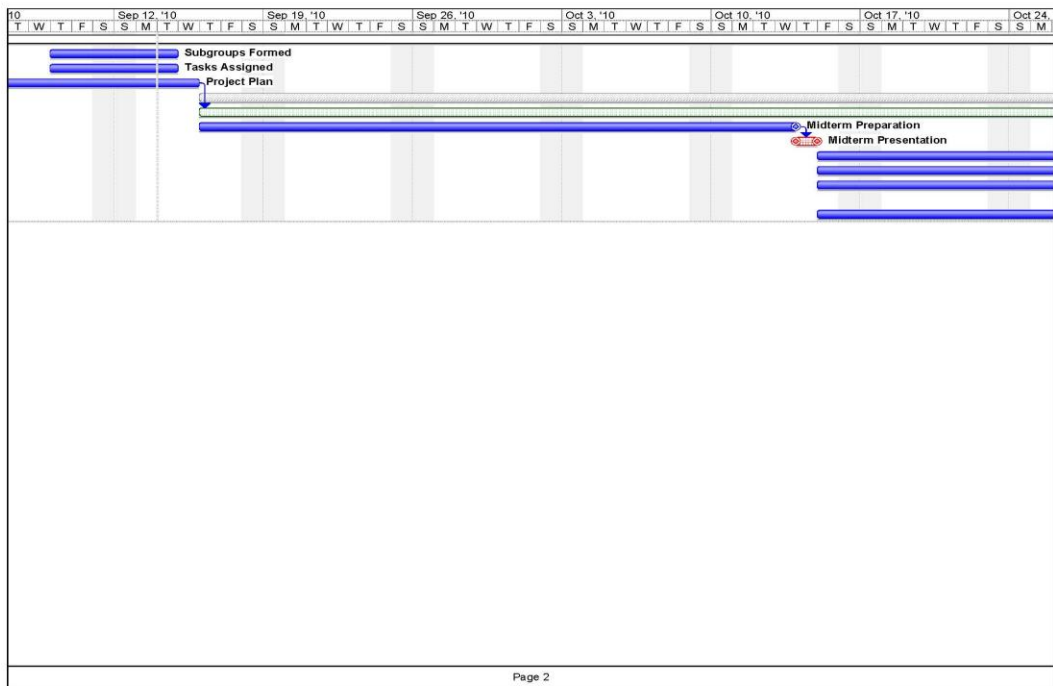
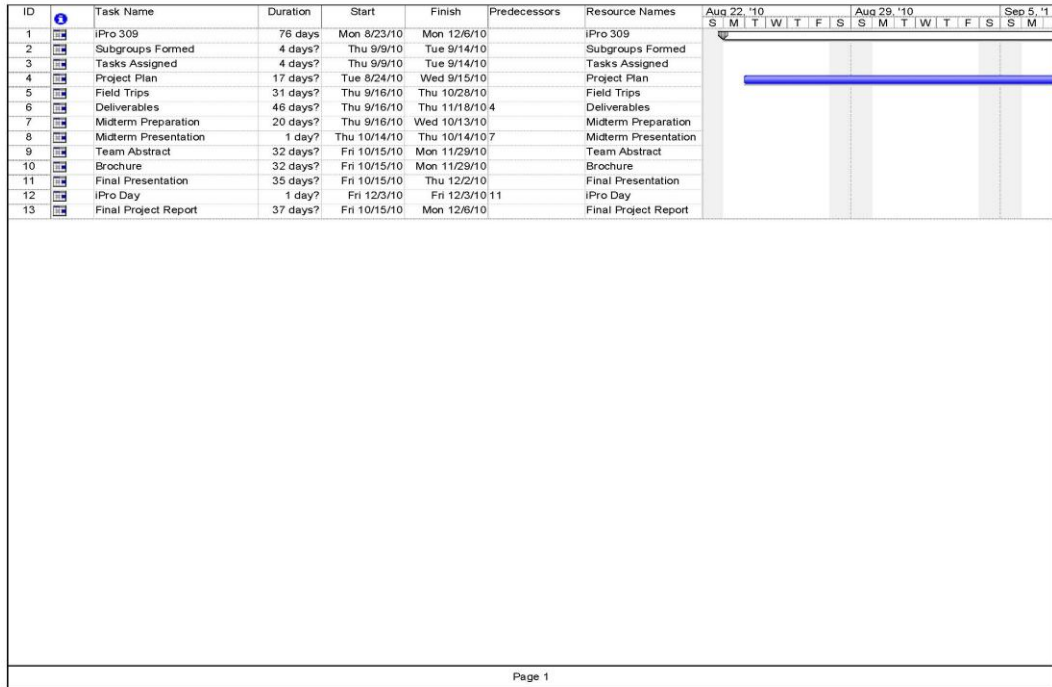
**Field Trip Coordinator-** The Field Trip Coordinator will be responsible for the organization of all field trips. This includes transportation, dates and times, locations, and educational value. They are expected to give no less than two weeks notice for a field trip to the team.

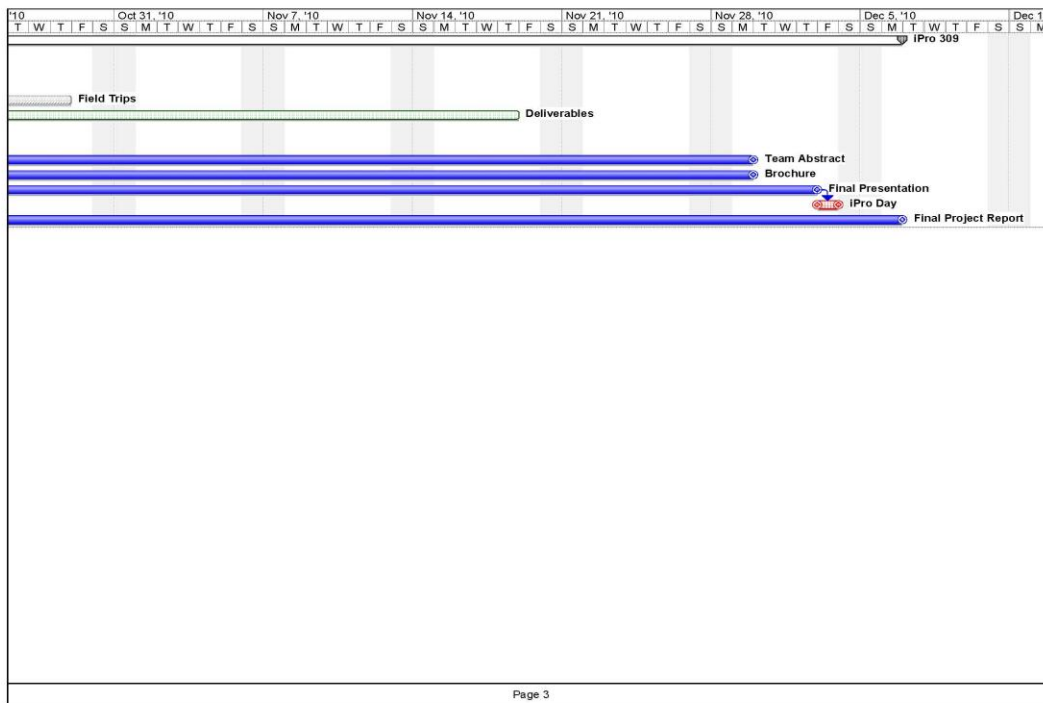
**Vice President of External Affairs-** The Vice President of External Affairs is responsible for all communications with outside institutions about the development of this curriculum or about its eventual implementation.

**Chief Marketing Officer-** The Chief Marketing Officer is responsible for all IPRO Day materials and events. They are responsible for coordinating the completion of all deliverables and presentations. They will also coordinate the mid-semester presentation and any necessary deliverables for that event.

**Web Designer-** The Web Designer is responsible for the creation and effective use of a website. They should determine, with the input of the team, whether or not a separate website is an effective tool. From there, he or she will decide on the appropriate content, organizational scheme, and how to present the material in a simple yet attractive way.

## 7.0 GANTT CHART & MILESTONES





## 8.0 COMMUNICATION

Each subgroup will document their findings via Microsoft office tools such as Word, Excel, and PowerPoint as necessary. Each subgroup is recommended to gather major findings and objectives achieved into a PowerPoint presentation to be demonstrated in class and facilitate discussions. Each subgroup presentation will be held every Tuesday and are expected to each last a maximum of 10 minutes in order to spare time for class discussions. Furthermore, all documentations will be uploaded to iGroups in an organized set of folders dedicated to the tasks being worked on. Each member is expected to politely and frequently inform each other of major developments and progress via email communications.

The classroom setting serves as an environment for the three subgroups to collaborate and consolidate information. Weekly updates will include objectives achieved and forecasts of future tasks. Each subgroup is expected to host meetings frequently outside of scheduled class time to work on research and documentations.