

Project Plan:

# Improving Global Supply Chain Management



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**Faculty Advisor:** John Caltagirone

**IPRO team:**

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## **I. Abstract**

The IPRO 306 team will be working with a sanitation and janitorial equipment manufacturer, Sloan Valve. The core competency of this company lies in manufacturing flush valves. Sloan Valve is currently one of the leading producers of flush valves in the Northern American Continent. The team will be assisting Sloan Valve in realizing two major projects.

The first project is to assist Sloan Valve in creating a Predictive Preventative Maintenance (PPM) plan. The objective is to change their current reactive maintenance plan to a structured preventative and proactive maintenance plan. This new plan will not only improve the condition of their equipment but also improve the overall production capabilities of the facility. The goal is to have the maintenance teams maintaining the equipments, instead of constantly fixing broken equipments.

The second project deals with improving and automating the current Warehouse Management System with the intent of reducing picking time and improving overall efficiency of the warehouse. The scope of the project includes implementing Radio Frequency (RF) system to replace the current manual practices, as well as defining, restructuring and developing data from the master material data, in order to successfully implement a new SAP system.

## II. Team Information

The IPRO 306 roster for spring 2010 semester, along with each team member's strengths, skills, and expectations, can be found in appendixes A & B.

### Team Purpose

IPRO 306 is a team of students brought together to gain practical and professional experience working with industry leading global supplier. The team plays an instrumental role in helping the company gain efficiencies through the strategic implementation of technology and process improvements.

### Team Objectives

- ❖ Meet and exceed the expectations of Sloan Valve and Mr. Caltagirone.
- ❖ Create a process map for PPM Program.
- ❖ Create PM process sheets in a format suitable for SAP upload.
- ❖ Create usable PM Templates, ready for population via SAP or manually.
- ❖ Clean SAP system data and populate (WM) screens in SAP
- ❖ Develop reports to have items stored in optimized locations
- ❖ Prepare CDC for bar code automation processing
- ❖ Formalize a process to roll out SAP warehouse management to other Sloan Warehouse Facilities
- ❖ Create written procedures and process flow documents for the process
- ❖ Establish metrics to track optimized performance
- ❖ Work effectively as a team, with passion and honesty, to achieve our outlined goals and maximize the benefits of this program.

### III. Background

#### History

Sloan Valve is a 104-year old, privately held manufacturer and global distributor of commercial valves and plumbing fixtures. The company was built on the invention of the Royal Flushometer, a type of high-efficiency, low-maintenance valve which was a far departure from the valves that flooded the marketplace. However, through the perseverance of the inventor and founder, William E. Sloan, the flushometer eventually became the standard in commercial construction.

Currently, the Sloan Valve network contains 8 different facilities: 4 manufacturing, 3 in the US and 1 in China, 1 foundry that supplies all of the castings for manufacturing, and 3 distribution centers (DC). Sloan has also expanded to Mexico in the 1960's including marketing, distribution, and specific line manufacturing. The Franklin Park location serves as the corporate headquarters, as well as, a primary manufacturer and replenisher of the distribution centers. Sloan currently employs over 1000 people and has estimated annual sales over \$50 million.

#### Current Issues

The current IPRO306 team addresses on two concerns from Sloan: (1) how to improve the efficiency of plant maintenance; (2) how to streamline the warehouse management process.

(1) Sloan has identified that within their concurrent equipment & facility maintenance system, the following problems may always lead to unnecessary but considerable cost:

- ❖ There are no formal procedures on how items are stored for maintenance purposes.
- ❖ Records are not refined or defined, and give limited history of equipment or components.
- ❖ Current process addresses only REACTIVE repairs; however, there are signals that PROACTIVE maintenance is urgently needed.
- ❖ There is no controlled inventory of spare parts.
- ❖ There is no pre-planned schedule of required tasks.
- ❖ There is no organized PPM program.

That is to say, solving those problems can result in noticeable cost-saving.

(2) Similar to (1), in Sloan's Warehouse Management system, fixing a series problems can lead to much higher efficiency and, eventually, great cost-saving:

- ❖ There are no formal procedures on how items are stored in the warehouse.
- ❖ Products are not easily identifiable in storage locations (e.g. not Bar-coded).

- ❖ Current process requires bin cards to be used; however, bin cards are not filled out properly or consistently, and reconciliation on bin cards is difficult.
- ❖ Bin locations are moved frequently with little or no control processes.
- ❖ There is sometimes confusion between finished goods inventory at the Central Distribution Center with similar or the same items in final assembly and other Franklin Park inventory locations.
- ❖ There are usually too many parts stored in one same location.
- ❖ There are sometimes too many shipping errors on outbound or internal orders.
- ❖ Inventory is not currently stored by volume of transactions.

### Technology & Historical Considerations

Currently, Sloan uses an ERP solution from SAP that includes a simple Inventory Management (IM) module. This module provides basic inventory functions, such as receipt of goods and the issuance of goods.

Although this system has worked, they need a new way to organize their products in the form of Warehouse Management (WM). The WM module can be used in conjunction with the IM module. Sloan aims to upgrade its current picking strategy with the use of bar code scanners, which will improve the accuracy of the product count by decreasing human error. They will also reduce the use of paper, increasing sustainability, which is a high priority to the company.

Data integrity issues are also very commonplace for companies that utilize ERP systems. This is often the result when the software implementations are not executed correctly or procedures are not properly defined and implemented. Since these are common issues, database administrators have been introduced to Master Data Management, which attempts to employ best practices to help deal with data integrity issues.

While these particular problems may be new to Sloan Valve, it is a commonplace in industry. SAP is considered the industry leader of ERP software and its software is employed by thousands of companies worldwide. It is very common for companies to “outgrow” their current solutions, or run on inaccurate data. There are countless companies that offer consulting services that would be provide effective solutions for Sloan Valve.

In addition, regarding the Warehouse Management System sub-project carried out by IIT's IPRO team, some of this semester's tasks are the continuation of the Fall 2009 semester's. The previous IPRO team has finished some preliminary work on the implementation of WM module in SAP: collecting relevant data and developing basic workflows for operators; in the spring 2010 semester, we will complete the implementation work as well as ensure that the new system is operational and stable.

## Ethical & Societal Considerations

There are no obvious ethical concerns. The only potential problems is that with many efficiency efforts, the company may tend to reduce the workforce; however, according to the stakeholders at Sloan, the work carried out within this IPRO306 project will only relieve the stress from the Warehouse Management personnel and Plant Maintenance personnel at Sloan, and make their workload more stable and more predictable.

## **IV. Team Value Statement**

### Desired Behavior

Each team member is to adhere to a set of guidelines listed below:

- ❖ View the Sloan Valve Company as an important client. All of their needs and expectations should be met and exceeded.
- ❖ Communicate with the staff at Sloan Valve and the other group members.
- ❖ Ask questions or ask for assistance when necessary.
- ❖ Complete tasks efficiently, effectively, and on time.
- ❖ Share information to keep everyone updated on progress.
- ❖ Maintain a professional attitude and atmosphere.

### Conflict Resolution

Conflicts will be handled and resolved in a civil and quick manner.

Problems will first be identified and understood. Communication will then be initiated to express feelings and concerns, as well as to brainstorm solutions.



## V. Work Breakdown Structure

### Problem Solving Process

To fulfill the need from the project sponsor, team members have been divided into two sub-teams: PPM team and WMS team. Each team will work on site at Sloan Valve at least once per week:

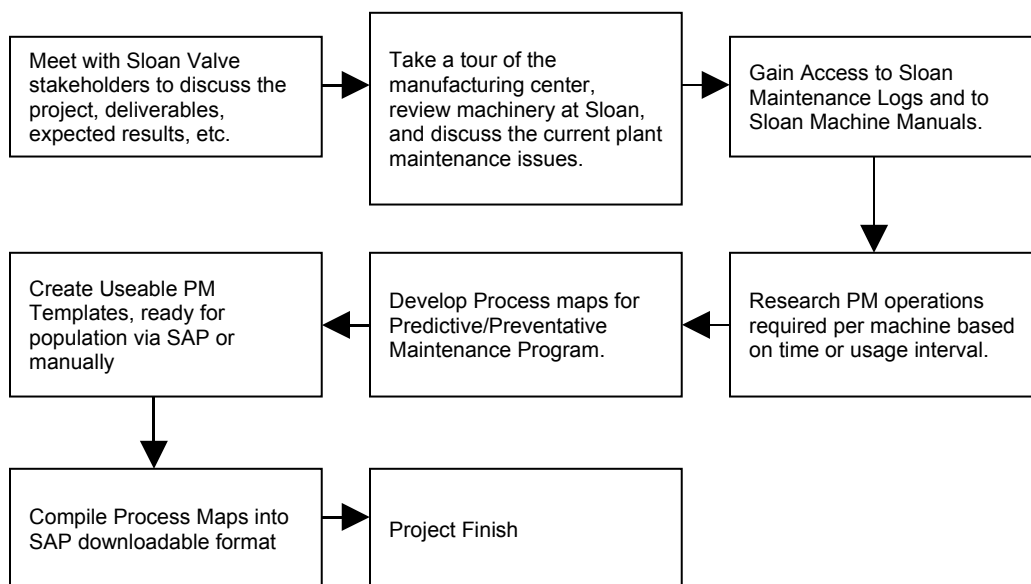
- ❖ PPM – every Tuesday, 9:00-16:00; depending on the workload, may send members to Sloan also on Wednesdays.
- ❖ WMS – every Tuesday, 9:00-16:00.

In addition, all the team members will convene every Thursday to review the project status and to discuss any problems.

### Predictive Plant Maintenance (PPM) project

Currently, Sloan has no organized predictive/preventative Plant Maintenance program. The team will have some off-site tasks for the client between each weekly meeting. The team will meet at Sloan once a week on Tuesdays; also, depending how much work will need to be done on site, some team members may work at Sloan on Wednesdays. The outcome of the project will depend on how readily information will be available to the team.

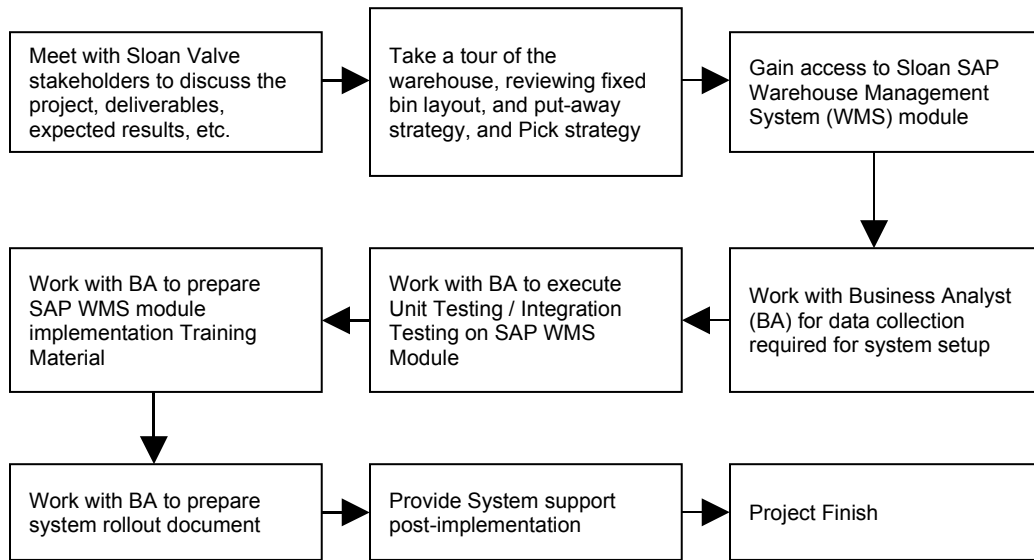
Below is a generic process for the Predictive Plant Maintenance project.



**Figure 1. Generic process for PPM project**

**Warehouse Management System (WMS) project**

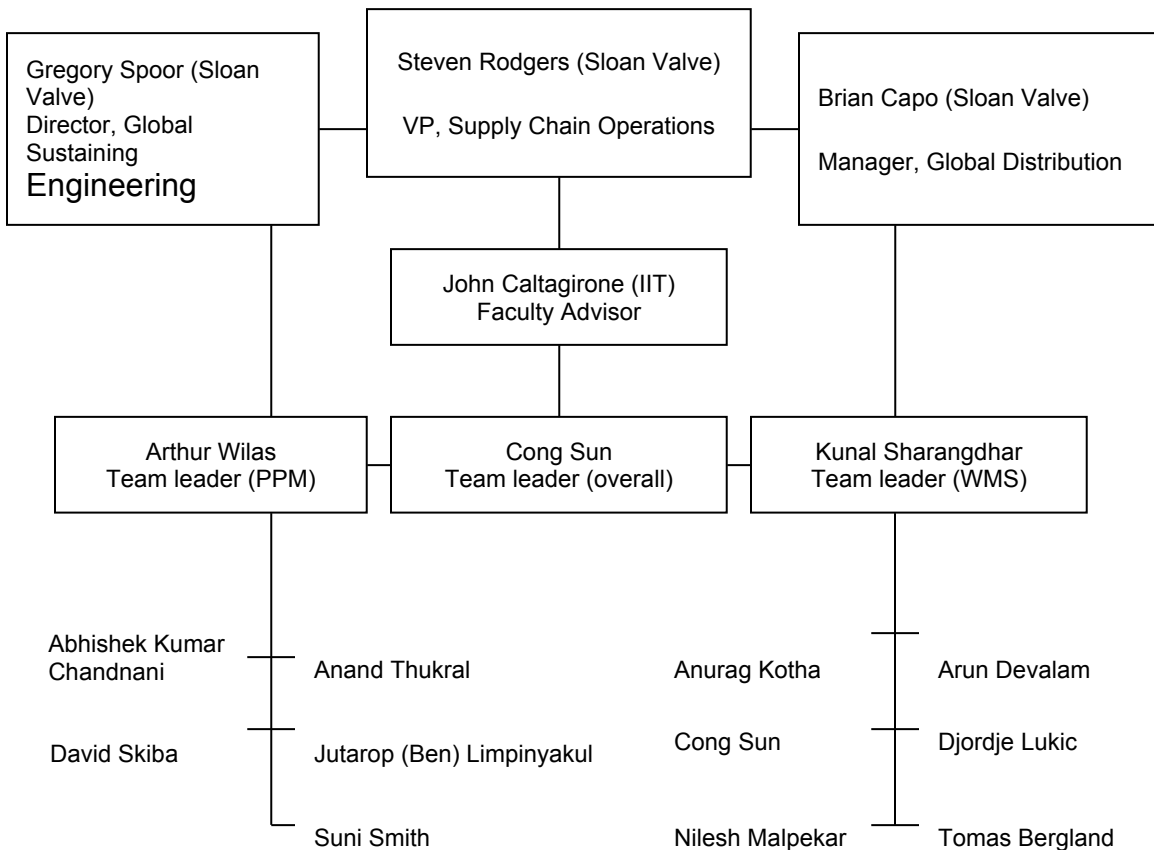
Below is a generic process for the Warehouse Management project. Assuming no significant changes in scope, this process should be completed within the IPRO time frame. The project assumes that there will be work for the client that must be done between each weekly meeting.



**Figure 2. Generic process for WMS project**

Team Structure

As stated before, team members have been divided into two sub-teams, with Arthur leading the PPM team and Kunal leading the WMS team. Cong acts as the overall project lead, responsible for coordinating the communication between team members and Sloan, between team members and Mr. Caltagirone, as well as between both sub-teams; in addition, he will be also one of the staff resources in WMS project.



**Figure 3. Team Structure**

Gantt Chart

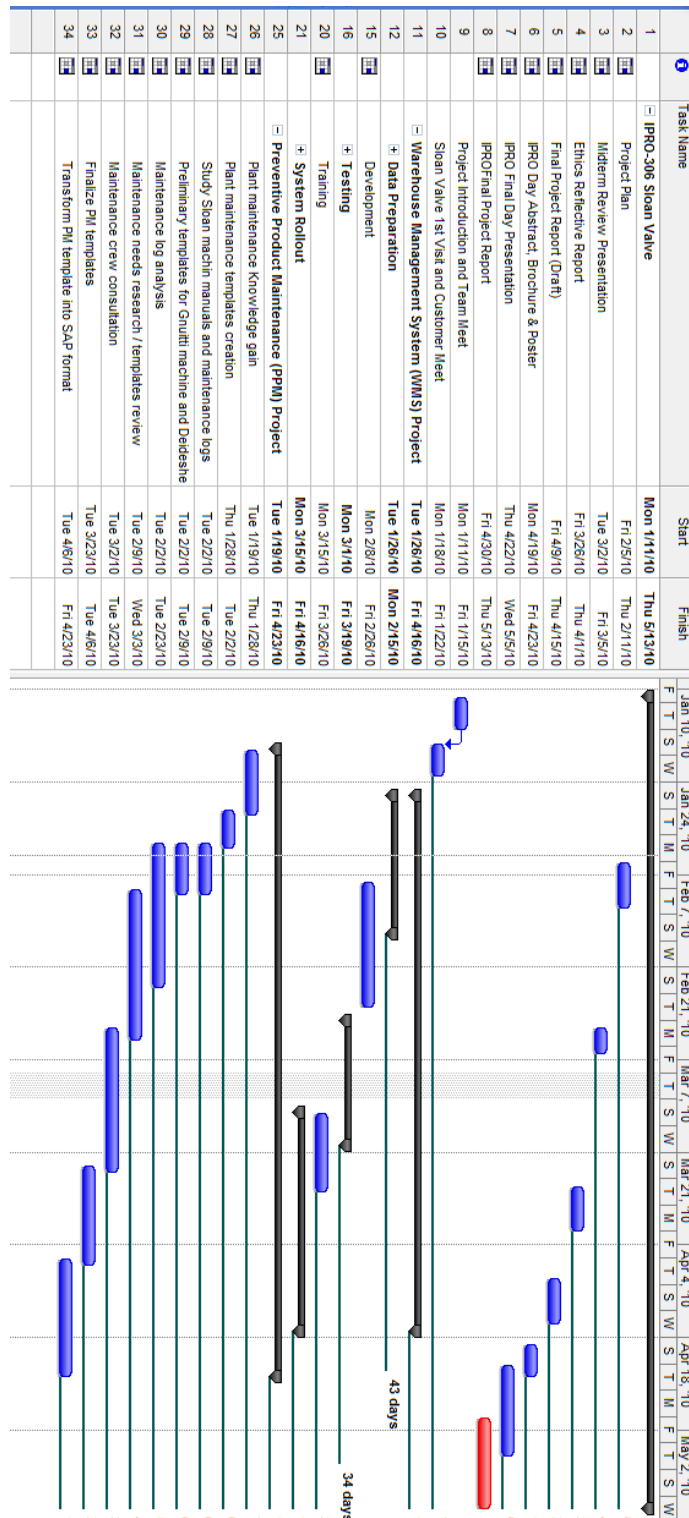


Figure 4. Gantt chart for IPRO306 in spring 2010 semester

## VI. Expected Results

Listed below are the results we aim to achieve for this project.

Goals to achieve & tasks to finish

### **For the entire IPRO team:**

On top of fulfilling and exceeding the customer's needs, we would like to develop some ideas regarding the following questions, which may be helpful not only to our own future career, but also to the students who are interested in pursuing consultancy jobs in future, as well as to the university's instructors who may design practicing courses similar to IPRO306:

- ❖ What types of tasks the customers usually expect the students to handle, especially when those students are from different majors?
- ❖ What difficulties the students may usually encounter, when most of them are involved in consultancy work for the first time?
- ❖ How should the students best utilize the opportunity of working in teams and serving real clients in the industry, in order to build their career portfolio?

### **For the Predictive/preventative Plant Maintenance team:**

They will help streamline the SAP regulated PM program for all equipment within Franklin Park facility, ensuring their accurate and efficient performance. To achieve this goal, they need to finish the following tasks:

- ❖ The team will start by accumulating of the PM operations required per machine based on the time and usage interval of a machine (top 75 units).
- ❖ Here onwards, the team will assist Sloan Valve in creating the present and future process maps for a world-class Predictive/Preventative Maintenance Program, which Sloan Valve can implement also at their other facilities.
- ❖ The final aspect of the PPM project involves compiling SAP into a format that can be downloaded.

The SAP-regulated PPM program would prevent time and financial losses, which Sloan Valve now suffers from currently, as the breakdowns are only assessed when they occur. The SAP project, when in place, would avoid uncertainty and allow the facility processes to proceed smoothly, even in the event of a machine failure or breakdown.

### **For the Warehouse Management team:**

They will help improve the performance of Sloan Valve's Center Distribution Center warehouse. To achieve this goal, they need to finish the following tasks:

- ❖ utilizing the SAP Warehouse Management module in putting away, storing, and picking & packing finished goods;
- ❖ developing policies and procedures for implementing the Warehouse Management module fully into the facility;
- ❖ testing all movements into and out of the warehouse;

- ❖ creating training documents; and
- ❖ providing related technical support.

### Expected deliverables

As part of the expected results, there will be the following deliverables:

#### **From the Predictive/preventative Plant Maintenance project team:**

- ❖ Process a map for the preventative plant maintenance (PPM) Program.
- ❖ Create PM process sheets in a format suitable for SAP upload.
- ❖ Come up with usable PM Templates, ready for population via SAP or manually.

#### **From the Warehouse Management System project team:**

- ❖ Clean SAP system data and populate (WM) screens in SAP
- ❖ Reports about how to store items in optimized locations
- ❖ Plans about how to prepare CDC for bar code automation processing
- ❖ Presentation to stakeholders showing accomplishments
- ❖ Report on a process to roll out SAP warehouse management to other Sloan Warehouse Facilities
- ❖ Written procedures and process flow documents for the process
- ❖ Established metrics for tracking optimized performance
- ❖ The live process in SAP for CDC warehouse

### Potential Obstacles to Project Success

#### **Regarding the WMS project:**

- ❖ There are multiple distinct (though related) tasks to finish and different reports/plans to compile; so the team will need to split into even smaller sub-groups, with each sub-group working on different tasks or deliverables. In this aspect, insufficient communication or unexpected workload surges for some sub-groups may lead to task delays for the whole WMS team.
- ❖ In addition, the team members will need to access the SAP system of Sloan and perform some tasks there; due to the complexity of the system and our limited access rights to SAP, we are not sure whether the SAP system may produce obstacles, for example, IT downtime.

#### **Regarding the PPM project:**

- ❖ The team may usually need to refer to the Operation Manuals of some machines while collecting their maintenance requirements; however, many machines are quite old, and the manuals for some of them may be even hard to find. This may add extra workload to the team.

## VII. Budget

**Table 1. Budget for IPRO306 in spring 2010 semester**

<b>Activity</b>	<b>Cost</b>	<b>Description</b>
Transportation	\$675	15 round trips to Franklin Park. Assumes a 30 mile round trip x 15 visits x 3 cars @ 0.50 cents/mile <sup>*)</sup>
Food	\$1,040	Lunch at the company. Assumes 13 people x 10 days @ \$8/meal <sup>**)</sup>
Printing / Supplies	\$150	Finishing costs for brochures/posters/final IPRO deliverables
<b>Totals</b>	<b>\$1,865</b>	

<sup>\*)</sup> Sometimes, some members have to use CTA's service but they don't have a U-Pass; however, for straightforwardness, here we only use the car-pool scenario to calculate the budget for transportation.

<sup>\*\*)</sup> It has been anticipated that in the 15 visits to Sloan, only for about 10 times the team need to have lunch at the company.

## VIII. Designation of Roles

### **Minute Takers:**

- ❖ During weekly team meetings on IIT main campus: Cong Sun. He will record the decisions made on those meetings, and send the meeting minutes to the team afterwards.
- ❖ For on-site time at Sloan: David Skiba (PPM team) and Kunal Sharangdhar (WMS team). They will record the decisions, events, project-related knowledge, and any other important information acquired during the time when each team is working or meeting at Sloan.

### **Agenda Makers:**

- ❖ During weekly team meetings on IIT main campus: Nilesh Malpekar. He will prepare an agenda for the weekly team meeting on IIT main campus, to ensure that the meetings are efficient and productive.
- ❖ For on-site time at Sloan: Arthur Wilas (PPM team) and Kunal Sharangdhar (WMS team). As team leaders, they will communicate with both Sloan and the team to decide the on-site agenda.

### **Time Keeper:**

Jutarop Limpinyakul. He will make sure that the weekly team meetings on IIT main campus proceed according to the agenda.

### **iGroups Moderator:**

Cong Sun. He will ensure that the deliverables for IPRO are completed and uploaded to iGroups on time, the team's iGroup account is updated regularly, and team members are notified about necessary information.



## IX. Appendix A

Here is the roster of the IPRO306 team, spring 2010 semester:

**Table 2. Roster for IPRO306 team in spring 2010 semester**

Team Member	Major	Contact Info
Abhishek Kumar Chandnani	MMAE-Mechanical Engg.(UG)	achandna@iit.edu
Anand Thukral	MMAE-Mechanical Engg.(UG)	athukral@iit.edu
Anurag Kotha	MMAE- Aerospace Engg.(UG)	akotha1@iit.edu
Arthur Wilas	Mechanical Engineering	awilas@iit.edu
Arun Devalam	Computer Science (UG)	adevalam@iit.edu
Cong Sun	MS - Techcomm & Info Design	csun11@iit.edu
David Skiba	Mechanical Engineering	dskiba@iit.edu
Djordje Lukic	MS - INTM	dlukic1@iit.edu
Jutarop (Ben) Limpinyakul	BS - Mechanical Engineering	jlimpiny@iit.edu
Kunal Sharangdhar	MS - INTM	ksharang@iit.edu
Nilesh Malpekar	BS - CPE (ECE)	nmalpeka@iit.edu
Suni Smith	INTM/EE	ssmith45@iit.edu
Tomas Bergland	Architectural Engineering	tberglan@iit.edu

## X. Appendix B

This is about each team member's skill set and expectations from the IPRO course.

**Table 3. Each team member's skill set & expectations**

Team Member	Strength	Weaknesses	Knowledge / Skills to Develop	Expectations for the Project
Abhishek Kumar Chandnani	Work oriented. Good organization and communication skills. Experience with MS office, C++.	No experience with SAP	SAP knowledge; Organization and data analysis skills.	Gain PPM experience & knowledge and hands-on industry experience
Anand Thukral	Work oriented; good communication skills	No experience with SAP	SAP knowledge	Gain PPM experience; develop good relationship with Sloan
Anurag Kotha	Work oriented. Good experience with MS Office, C+, and Java.	Organization Skills	SAP knowledge	Gain on-site experience and knowledge about Warehouse Management.
Arthur Wilas	Good at communication	Not too good at computers; no experience with SAP	Skills in organization and information gathering	Gain experience in tasks that are presented in a corporate and industrial working environment
Arun Devalam	Good with writing programs; proficiency with Linux, Mac, and Windows operating systems.	Not good at managing or leading teams	Gain SAP knowledge; learn to work in a proper industrial environment	Gain first-hand experience
Cong Sun	Experience in technical writing, technical proofreading, and project management	No experience with SAP or with warehouse management systems	Knowledge about SAP, warehouse management, and logistics	Gain hands-on experience in tasks related to consultancy and industry management.
David Skiba	Proficiency in MS Excel and Word	No experience with SAP	Knowledge about plant maintenance and SAP	Have the chance to learn about plant maintenance and PPM scheduling

**Table 3. Each team member's skill set & expectations (Continued)**

Team Member	Strength	Weaknesses	Knowledge / Skills to Develop	Expectations for the Project
Djordje Lukic	Previous management experience. Proficiency in MS Office, MS Project, Auto CAD. Good communication skills and good customer relations	No experience with SAP; limited time availability	Knowledge about SAP and supply chain management processes	Gain academic and practical knowledge in dealing with different warehouse management systems and become more familiar with all aspects of supply chain management.
Jutarop (Ben) Limpinyakul	Experience with material failure criteria and measurement equipment	Organization and planning	Knowledge about SAP, preventative maintenance, and failure prediction	Gain experience with failure prediction in real-world applications and with the implementation of a preventative maintenance system at Sloan.
Kunal Sharangdhar	Good leadership and communication skills. Good analytical skills and decision taking abilities. Team player, with very good interpersonal skills. Proficient in Microsoft office.	No SAP experience and little industry experience	Knowledge about SAP, industry workings, and Supply Chain.	Gain hands-on industry experience and hone management and leadership skills. Acquire knowledge on different aspects of Supply Chain and Warehouse management.
Nilesh Malpekar	SW Project Management; Business Analysis; Technical Architecture	No SAP experience	SAP knowledge	Gain knowledge about SAP WMS implementation.
Suni Smith	High performance computing, Simulation, Problem solving	Never used SAP	SAP knowledge	Learn more about PM
Tomas Bergland	Skills in organization & communication; ability to work with numbers properly	Never used SAP; never worked in professional environment; never put together a large-scale project	SAP, professional planning, get familiar with warehouse management	Get to know how a company manufactures, stores, and distributes products efficiently.