IPRO 348: The Universal Car Project: Applying Open Source Concepts to a Global Automobile Design Platform

Project Plan

June 17, 2011

Professor Blake Davis

Bahar Aynaci
Daniel Dobbin
Karthik Prabhu
Christopher Williams

Andrew DiCosola
Sooraj Kumar
Dwayne Sanders

Justin Dickman
Kaleo Pedrina
Erfan Setork

Table of Contents

I. Team Information

Roster			
		Contact Information	
Team Member	**Major**	**Email**	**Phone**
Justin Dickman	Aerospace Engineering	jdickman@iit.edu	[redacted]
Kaleo Pedrina	Electrical Engineering	kpedrina@iit.edu	[redacted]
Daniel Dobbin	Applied Mathematics and CS	ddobbin@iit.edu	[redacted]
Bahar Aynaci	Electrical Engineering	aynbahar@yahoo.com	[redacted]
Karthik Prabhu	Mechanical Engineering	kprabhu1@iit.edu	[redacted]
Dwayne Sanders	Industrial Technology & Management	Dsander3@iit.edu	
Andrew DiCosola	Information Technology and Management	adiscosol@iit.edu	[redacted]
Sooraj Kumar	Aerospace Engineering and Business Admin.	Skumar39@iit.edu	[redacted]
Erfan Setork	Information Technology & Management	esetork@iit.edu	[redacted]
Chris Williams	Applied Mathematics	cwilli15@iit.edu	[redacted]

Team Information				
Member	**Strengths**	**Weaknesses**	**Knowledge**	**Expectations**
Justin Dickman	Experience with automotive industry, 3D modeling in solidworks, ProE Wildfire and Autodesk	Public Speaking, taking on too much work within groups	Improve 3D modeling skills, Improve management skills	Gain more exposure to automotive manufacturing process, Develop future contacts within the automotive industry
Kaleo Pedrina	Public speaking, leadership skills, public speaking, outgoing, team player	Time management, taking on a lot of work	Improve knowledge of automotive industry and ways to apply Electrical Engineering	I would like to learn how electrical engineering can be applied to other fields. Also form this IPRO, I would like to set a good foundation for continuing IPRO classes
Daniel Dobbin	Adaptability, quick to learn, can stay on point	Speaking up in a discussion, taking a leadership position	Problem Solving, MATLAB, various computer languages	A good platform for the next IPRO team to take up the reins
Bahar Aynaci	Researching abilities	Computer Skills	Improve Computer skills	I would like to see the input I contribute in the final product
Karthik Prabhu	MS Office, 3D Modeling in CAD and Solidworks, Finite, Element Analysis, Problem solving	General web design and maintenance, management strategies	Additional 3D modeling in Solidworks, Web design	Create a successful platform for the IPRO so that future IPRO groups can one day launch this idea.
Dwayne	Worked four years as an	Public Speaking	I would like to	I hope to gain networking skills

Sanders	Information System Technician and one year in customer service; I am a team player with a technology background.	and shyness are my self-known	develop my networking skills and become an outgoing person	by befriending those that possess these skills. I also expect to share knowledge I have gained in my field and area of study to contribute to the team project when needed.
Andrew DiCosola	Leadership, computer technology, Designing	Time management	I would like to develop time managing skills as well as gain more leadership skills	From this ipro I would like to learn about other different majors as well as work with other from those fields and use my current skills and apply them to other fields of work
Sooraj Kumar	Creative, patient and determined with a sense of humor.	Perfectionist with too much of a helpful attitude sometimes.	Structural mechanics, dynamics, thermal systems and thermodynamics , Expertise in 3D modeling, Expertise in aerodynamics.	In-depth analysis of automobile mechanics, Design and analysis of chassis and suspension systems.
Erfan Setork	web development, IT networking , programming, database development	Design aspect	Basic knowledge of the components of a car and the functions of a chassis. I plan to use my IT skills to develop our Wiki and also help on the development of the website.	gain a real life example of working with a group of professionals trying to accomplish a specific task
Chris Williams	Time management, creativity, Team player, Research	Public speaking, Computer programming	Expand knowledge on automotive industry	See a completed model for the main goal of the engineering group. Learn to do a 3D model using solidworks

II. Team Purpose and Objectives

Abstract

The Universal Car Project is an attempt to utilize the web to design and specify a “universal” platform upon which a wide range of functional vehicles can be designed for developing countries. The method for developing the car will be to start with a “wiki-type” organization that will develop the standards for the basic platform, including wheel-base, construction method, materials, and standard mounting points. Once the basic platform has been standardized, the rest of the car will have an “open architecture”. Everyone who has interest and expertise could utilize the basic platform to design parts/assemblies to turn it into a complete vehicle. Individuals/companies/countries would be able to customize the platform to produce any type of vehicle that was needed or desired.

This IPRO will design the process for developing the Universal Car Organization (UCO), which would design and license the basic platform and make sure that its standards were maintained. The UCO would also certify that parts/assemblies were attachable to the basic platform. Otherwise they would allow individuals/companies/countries to design and build whatever type of vehicles needed in their countries/regions. This would utilize the expertise of many more individuals and companies than is now available to the automobile industry.

Team Purpose

The IPRO 348, being a newly developed IRPO and without a sponsor, has decided to take the IPRO in a direction to gain input from multiple automotive companies, organizations, manufacturers as well as professional gain some insight to how the final design for a universal vehicle platform.

Team Objectives

- Get in contact with multiple Companies, Organizations, manufacturers for input on the project
- Research general requirements for vehicle inspections, safety requirements and cost analysis
- Create a web page/web forum to gain input
- Create a wiki page for the Universal Car project
- Research on different rear suspensions to generate a universal set up
- Design and 3D model the rear suspensions
- Though split in to two main groups (Technical Support and Engineering), we look to still work together as a team to keep everyone updated on what the team is accomplishing

III. Background

IPRO 348 – Universal Car Project is a newly developed IPRO. As a newly developed IPRO, we currently do not have a sponsor. With our current project plan, one of our goals for this summer is to get in contact with multiple companies and organizations in hopes to gain interest in out project and possible sponsor the IPRO in future semesters. Some examples of companies we plan to look into are: Tata Motors, Hindustan and Magnum.

Current Issues & History

The cars in the current automotive industry on have certain components that can be changed easily. Since we are targeting developing countries we have found that cars a too expensive to be widely used in these countries. Since the automotive market is limited, there is only a hand full of companies that are capable of this complexity of a design as well as taking the risk.

There are multiple automotive companies that do use the same chassis for different vehicle models. However, these chassis are not capable of crossing over between different companies. Currently, Theodore and associates are attempting a high end universal chassis for specialty car and hybrid vehicles.

Technology & Implementation

The IPRO 348 team is utilizing the skills that everyone can contribute in order to start off a solution. We have been broken into two main groups, Engineering and Technology. The technology will be in charge of create and design a website. The website will be used to show our ideas and designs in hopes to gain interest from companies and automotive manufacturers. This will also have a forum where we will get input to what people are looking for in a universal Chassis.

The Engineering team will be doing research to come up with different possible models for a universal chassis. The team will be focusing on a section of the universal chasses and how it would work. After research is done, the team will be using solidworks along with other 3D modeling software's to show how components would fit and how the different components would work and be integrated into the design. The 3D model will be able to show how different car models will fit on to one chassis.

The Technology Team will relay any information received through the website to the entire team on a class to class basis.

Ethical Issues

IPRO 348 has discussed that there have been multiple ethical problems that may arise. One being that, if we are creating a universal model, will there been any disadvantages or sacrifices we would need to take in order to come up with a final model. Our main concern is with safety, will the universal chassis be as safe as any other chassis. Another issue that came up was that if we are creating a universal, cheaper chassis, if it will also decrease the initial cost of a car. If the initial cost of a car would decrease, there is a possibility of the amount of cars purchased would increase as well and in the long term effect, have an effect on the environment. Lastly, we believe that if a universal chassis is created and all or majority of automotive companies use the design, if it would increase the efficiency and possibly lead to people being laid off.

IV. Team Value Statement

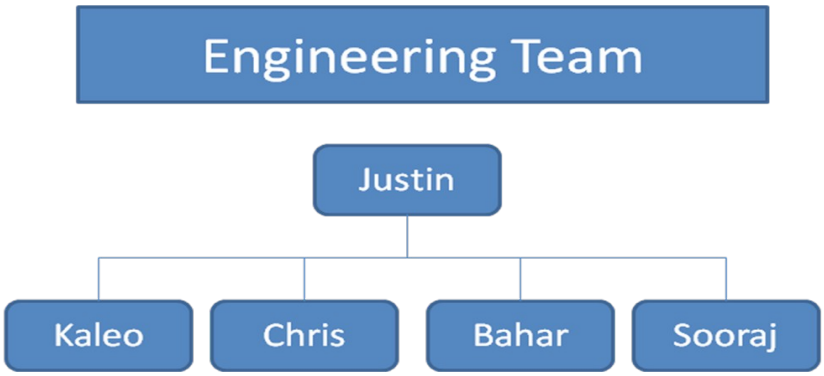
Desired Behavior

- Keep entire team up to date with current progress of the IPRO
- Keep a positive and optimistic point of view
- Complete tasks in a timely manner, and ask if assistance is needed
- Be respectful to one another.

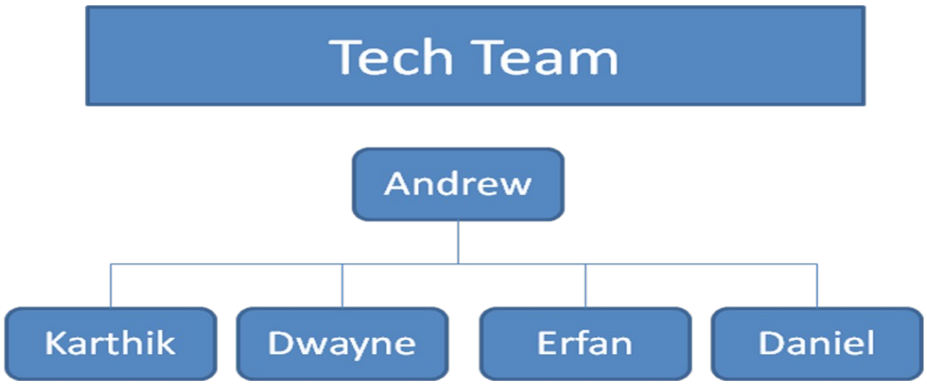
Conflict Resolutions

If there is any conflict between students, we will approach our team leader about the issue at hand. With the team leader the issue will be thoroughly explained by both parties and as one speaks the other will listen. All parties will be respectful to one another and will address the problem with the team leader as the mediator. Once a solution has been found, we will record for further reference so that we may have something to turn to if the problem arises again. The main thing is that when solving any conflict that we are respectful and listen.

V. Work Breakdown Structure



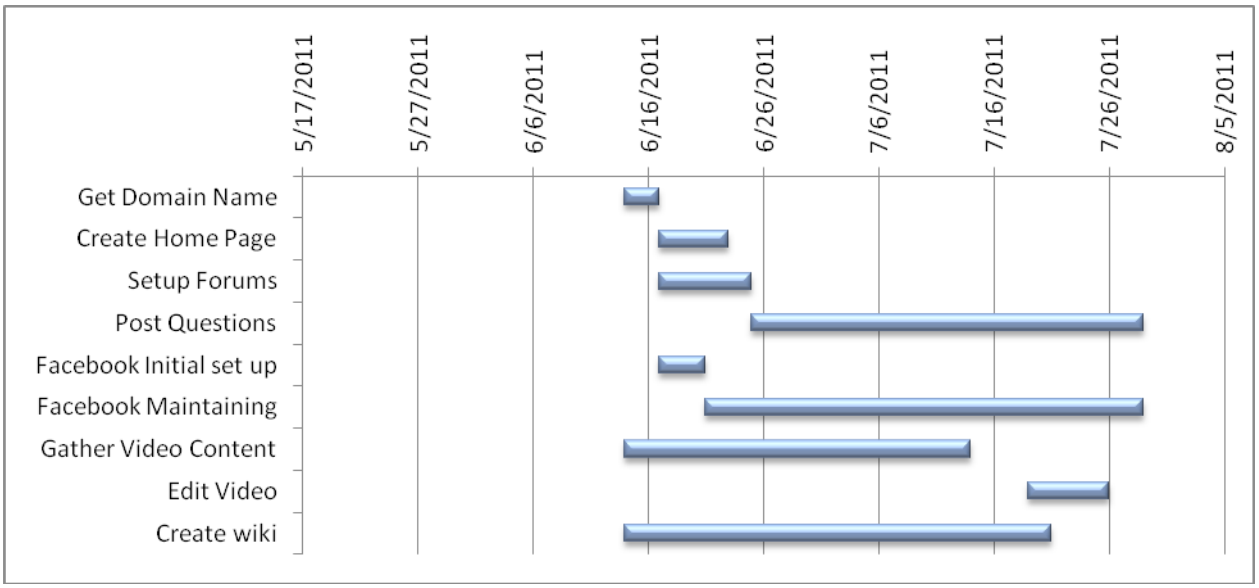
The engineering Team is lead by Justin. The main goal for the engineering team is to get sufficient amount of data to come up with multiple possible designs for a universal chassis. Justin and Sooraj are leading in coming up with a design and doing a prototype. Kaleo, Chris and Bahar are working together in getting in contact with the automotive industry to gain professional input to use in the design. All team members of the Engineering team will be working together in building an actual, possibly life size model of the rear suspension.



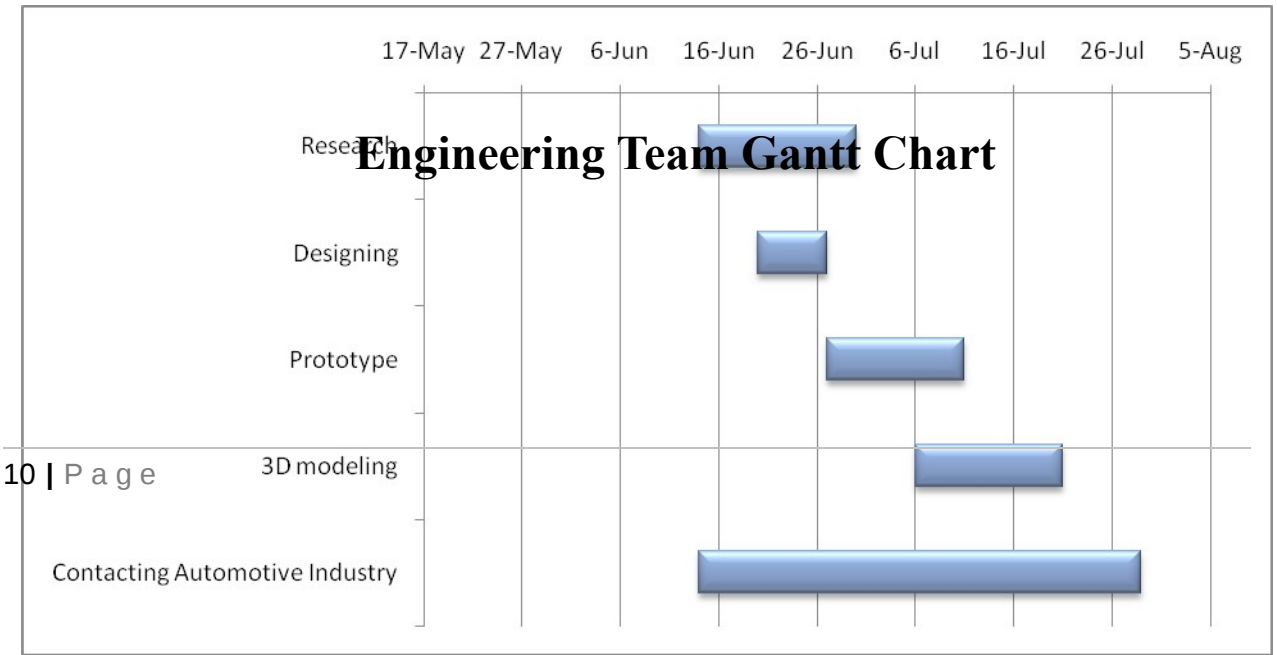
The tech group is Andrew. The main goal for the Tech team is to create a website that will have information about the goals of our IPRO and possible designs. The site will also have a forum where we will be able to post questions and gain input about the project, ranging from people who build cars at home to automotive industry professionals. Andrew, Efran and Karthik are working on getting a domain name and server space to get the website up. Dwayne is in charge of setting up and maintaining the IRPO 348

facebook web page. Daniel will be taking video/pictures of all doings of the IPRO for the end of the semester video.

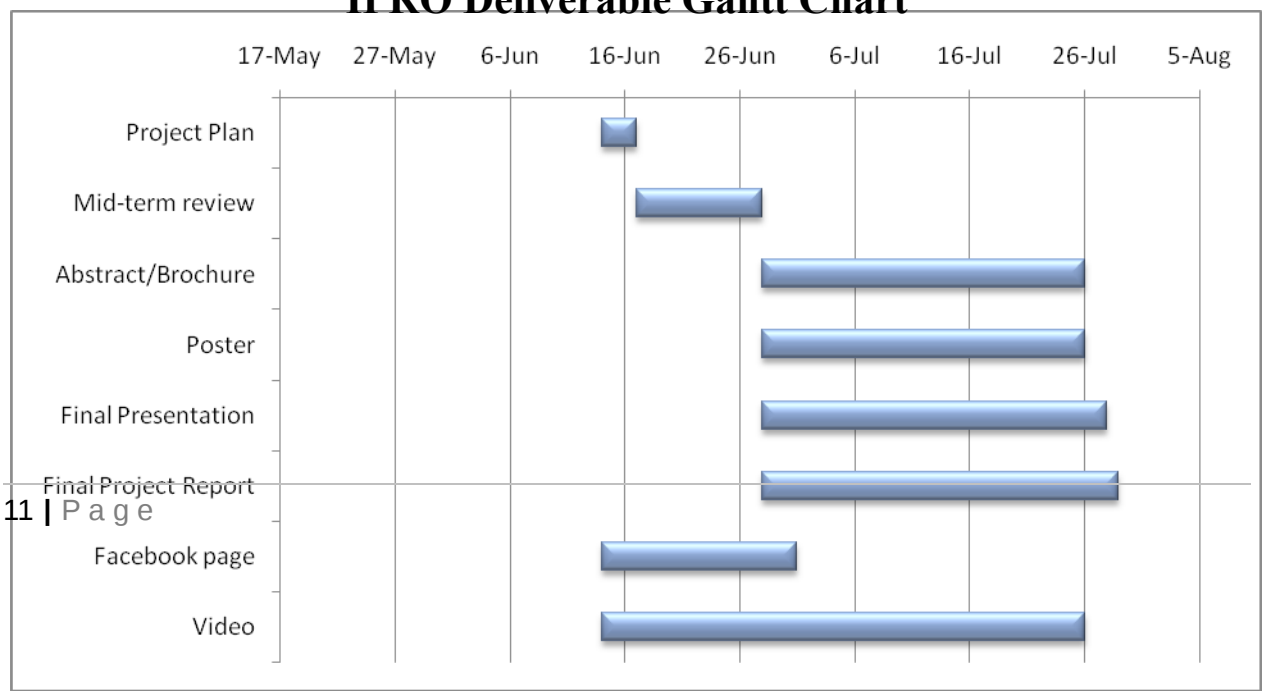
Tech Team Gantt Chart



Engineering Team Gantt Chart



IPRO Deliverable Gantt Chart



VI. Expected Results

1. Create a webpage that contains our goals and designs. Page will include a forum where we would able to get input from multiple resources on what people are looking for, for a universal platform
2. Research, Design, prototype different possible models for a universal chassis
3. Research, Design, model a rear suspension for an automotive vehicle

VII. Project Budget

	Cost	Reason
On site tours	1000	2 cars, one trip to Detroit to do automotive factory tours. 600 miles x 2 cars x .5/mile = $600. 2 cars, one trip to Lafayette for automotive factory tours. 250 mile x 2 cars x.50/mile = $250. $150 for local small automotive company tours
Prototyping	500	3D modeling printing in the idea shop. $10 per cubic inch
3D model	300	Materials for an actual model using real car components
Website	200	Average Cost for server space, hosting, maintaining and domain name
Team Building Session	100	Group activities to build group confidence and trust
Total Cost	2100	

VIII. Designated Roles

Minute Taker – Documents all discussions during meeting and uploads document on to igroups.