



ECEN403

Electrical Design Laboratory I

Fall 2016

Submission Date: September 08, 2016

Senior Design Project Proposal

Shell Eco Marathon

Team Members:

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Mentor:

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Supervisor:

Dr. Ziyad Shafik

“On my honor, as an Aggie, I have neither given nor received

Unauthorized aid on this academic work”

Abstract:

The effects of energy fuels used daily by machines driven by humans each day is a huge issue that environmentalists are stressing about. Therefore energy companies are trying very hard to try and create a solution for this problem. Each Year around the world Shell Eco marathon competition takes place, this year taking place in Singapore. The aim of this competition is to encourage students to create and design cars that are energy efficient. The main purpose of this project is to create a vehicle that would compete and cope with the changes happening in the world right now. This means that car manufacturers and students in this case should start and focus on how to build a car that would use the least amount of fuel for the longest distance possible. In this project the group will concentrate on creating a vehicle that could adapt to a small amount of energy, by creating a car that is light weight, also has great body dimensions to be optimum when it comes to aerodynamics. My part of this project is to design and implement all the electrical circuits the car needs, including all the auxiliary systems. In addition to that, to design and create an “Engine Monitoring System”, that will act as the first aid for the driver during the competition.

Project Description:

For the Shell Eco marathon car being built for this year, the mechanical department has registered its car in the GTL division that will run on diesel fuel. My main job in the upcoming months is to work, design and supervise all the electrical work that needs to be done on the car. My first main job is to be responsible for the auxiliary systems the car needs. This includes all the lights the car would have both front and rear. In addition to that of course the signals that the car would use for turning. Also the brake lights needs to be installed and connected with the brake mechanism. To do so a junction box would be added to support all these systems to be running. Going back to the basics all the wiring would have conduits to protect them from any damage. All wiring systems would have to be up to IP standards for it might be raining during the competition.

My second main Job in this project is to create what I call the Engine Management System, which will be mainly beneficial for the driver to know if the car systems is running well. By saying this, the system will show the following:

- Oil Temperature
- Water Coolant temperature
- Air Pressure in the tires
- Speed and Rpm
- Fuel consumption
- GPS system
- CO₂ Emission

This system will get all the information using sensors that would be installed in various parts around the car. This system will act as both a tool of knowledge and safety for the driver during the competition. All of these information will be displayed on a LCD screen that will show these either in numbers or gages.

Problem Statement:

One of the major problems that the world is facing since the industrial revolution till today is the amount of emissions that machines produce in order to work. This problem has many factors that people started looking into to ensure a survival for earth. When it comes down to cars, the amount of CO₂ emissions is tremendous. In Shell Eco Marathon, the aim is to create a vehicle that would be able to run on a specific amount of fuel for the longest distance possible. To do so, one should focus on how the car rides, including aerodynamics, weight of the car, lowest amount of friction possible with the ground, an engine that would be efficient and not burn excessive amounts of fuel and many other things. These types of experiments and research is very important to help minimize fuel emissions globally to maintain a clean energy globe running for the next generations.

Timeline:

Project Timeline	
Look for a mentor, and a project	23 rd – 29 th August 2016
Project Proposal	3 rd – 8 th September 2016
Project Website Assembly and upload	4 th – 8 th September 2016
Create a detailed list of all material needed	17 th – 21 st September 2016
Project Proposal Presentation	18 th – 27 th September 2016
Order of all materials needed for the project	27 th – 29 th September 2016
Initial circuit design to be implemented	2 nd – 16 th October 2016
Progress Presentation	23 rd October – 1 st November 2016
Designing and creating the EMS	<i>Depends on when the materials will arrive</i>
Final progress Presentation	22 nd – 29 th November 2016
Peer Evaluation	4 th December 2016

Budget:

Material	Number of Pieces required	Cost for all pieces
Raspberry Pi 2	2	\$ 180
Oil Temperature Sensor	5	\$ 185
Coolant/water Temp Sensor	5	\$ 185
Flow meter (Fuel Consump)	5	\$ 185
Air Pressure sensor	8	\$ 500
Distance/speed meter	5	\$ 445
CO ₂ Sensor	3	Available
LCD Screen	2	\$ 25
Ultrasonic Sensors	3	\$ 215
GPS module/Antenna	1	\$ 75
LED lights	12	\$ 50
Fuse box	1	Available
Wiper	1	Available
Horn	1	Available
		<u>Total Cost = \$ 2045</u>

Task	September				October				November				December			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Project Proposal																
Project website assembly and upload																
Create a detailed list of material needed																
Project Proposal Presentation																
Place material for order																
Initial circuit design to be implemented																
Progress Presentation																
Designing and creating the "EMS"																
Final Progress Presentation																
Peer Evaluation																