

## SENIOR DESIGN PROJECT COMPETITION APPL697 (Fall Term)

This term we will have a design competition: a race between robots wirelessly controlled by biopotential signals.

Project Description: Groups of 6-8 students will each design a simple robotic system that will be controlled by means of a biopotential. The system “driver” will have electrodes attached to them, and they will use their biopotential signals (such as EMG or EOG) to generate control signals for the remote robot. The biopotentials will be detected and processed and decoded into control signals. The control signals will be sent wirelessly to control the motion of the robot. Minimum control signals include: *Forward, Stop, Reverse, Turn Right, Turn Left*. Each group will meet with the instructor at his laboratory in room 401 Taylor Hall each week. The general schedule will be:

Lab week 1: Safety training and check-off.

Lab week 2: Develop design specification and begin work on design concepts.

Lab week 3-6: Decide upon the design and start building (through the end of October).

**Alpha prototype** should be finished and ready for testing by the last week in October.

Plan on about 4 weeks for redesign and optimization (the entire month of November).

**Beta prototype** should be complete by the first week in December.

The race will be planned for a suitable date at the end of the term.

### Project requirements:

During the project you must maintain a Design Notebook that must contain at least:

- 1- A statement of the design problem
- 2- Design Specification
- 3- Functional Decomposition (logical flow chart of how the system will operate)
- 4- Design concepts & concept selection
- 5- Detailed designs
- 6- List of materials and sources (Bill of Materials)
- 7- Alpha-prototype
- 8- Quantitative evaluation of performance of the prototype vs. the design specification
- 9- Design modifications and optimization
- 10- Beta-prototype
- 11- Quantitative evaluation of beta- vs. alpha-prototype performance

The project will be worth 50% of the total class grade. Grading is based on your attendance and engagement in the laboratory meetings. You will not be graded on the basis of how well your project performs in the final competition. Groups and meeting times are:

### **Tuesday 1-5pm**

Tejan Diwanji <diwanjit>  
Theresa Forshey <tforshey>  
Rupa Pandya <rpandya>  
Sagar Rathie <srathie>  
Henry Saye <hsaye>  
Nimit Shah <npsah>  
Yidi Turman <turman>

### **Wednesday 1-5pm**

Nick Baker <nlbaker>  
Kristen Condron <condron>  
Elliot Greenwald <ellgreen>  
Sachin Kulkarni <sachin>  
Jen Lee <jalee>  
Swarna Solanki <solanki>  
David Zilber <dzilber>

### **Thursday 2-5pm**

Omar Awan <omawan>  
Aras Kabaca <abkabaca>  
Deep Mehtaji <mehtaji>  
Daniel Millard <dmillard>  
Richard Nguyen <rnguyen>  
Chris Walthers <chrismw>  
Pieter Kreuk <kreuk>  
Kevin Guley <guleyk>