ChE 294/494 Special Topics: Controlled Propulsion – Car Design/National Competition

Phone: 480.727.9689
Email: cit@asu.edu
Office hours: GWC548 Mon 11:00am-noon, Tue noon -1:00 pm or by appointment

Credits: 1 (Fall Semester)
Class Hours: Group Meetings organized weekly, depending on students' schedule
Instructor: César I. Torres

Prerequisites: Engineering major
Course Overview: This class provides a hands-on experience in the conception, design and implementation of a shoebox sized car that is driven by a chemical reaction. The design must conform to rules established by AIChE. The students will focus on the design of the car and the chemical reaction. Students that qualified for an AIChE National Competition will focus on optimizing the car for this event.

Objectives:

(1) Develop decision making skills for real world problems
(2) Learn techniques to effectively control chemical reactions at small scale
(3) Work in teams to accomplish a goal
(4) Learn about safety incorporation into design

Class format: This class requires independent efforts of individuals to come together as a team for the car to be successful. Tasks with deadlines will be assigned throughout the semester. There are no set meeting times for the course, but weekly team meetings will be required for the project to progress. The length of the meetings will depend on the task at hand. Students are responsible to ensure that all safety protocols are followed during all stages. Approval from the instructor is required prior to performing any experiments.

Academic Integrity: Academic dishonesty will not be tolerated. Please see the Student Code of Conduct set forth by the Arizona Board of Regents. This includes copying of homework. You are encouraged to discuss the homework problems with your classmates, but the final work that is turned in must be your own.

Timeline for course during the Fall semester (Car Design):

Weeks 1-2: Develop alternatives for car power. Gather data from literature. Select most promising alternative with contingency plans. Include information on Wiki.

Weeks 3-6: Design reaction system, drive-train and car body. These choices will be interrelated, so good communication during this stage is critical. Finalize design. Find all required parts and purchase. Include information on Wiki. All purchases must be approved in advance. Obtain training for operation of tools in machine shop.

Week 7-15: Construct and build components for the car. Ensure that all safety regulations are followed. Design and perform bench experiments on proposed reaction for powering car. Note that instructor approval of the experimental plan is required. Include information on Wiki. Complete car to functioning. Perform preliminary calibration curves for the distance traveled by the car.

Grading: Grading for the class will be based on the following:

- Successful Completion of safety training and exam
- Submission of at least one experimental plan for approval
- For new Car designs, demonstrate the following:
    - A chemical reaction is able to move the car's motor (if there is one) with no load
    - The chassis of the car is near completion, pending only small modifications
- Individual reports outlining the student's work throughout the semester.