

ME 72 (b): Engineering Design Laboratory

Overview of Course Schedule and Course Mechanics

Instructors:

Class Instructor: Vilupanur Ravi, Thomas 303, 395-4178, vravi@caltech.edu

Shop Instructor: John Van Deusen, Spaulding 024 (Sub-basement M.E. Shop)
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TA (Grad): Melissa Tanner, melissa@caltech.edu

TA (Undergrad): Colin Ely, elyc@caltech.edu

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Course Web Site: <http://robotics.caltech.edu/~me72/>

Course Objective:

The overall goal for this quarter is to complete your preparations for the ME 72 contest, which is scheduled to start at 1:00 p.m. on Tuesday, March 8th, 2011. Now that you have chosen a design concept and have started the prototyping phase, the main focus of this quarter is to complete your analysis, and then build, test, and refine your concepts in preparation for a successful demonstration on competition day.

Key Milestones:

The primary learning this quarter will take place during the process of building and fielding your contest entry. Milestones for this term will be:

1. On site mobility demos – Beckman Mall
2. Critical Design Review – 301 Thomas
3. On site scoring demos – Beckman Mall
4. Mock Competition – Beckman Mall
5. Final Competition - Beckman Mall

Class Deliverables and Grading:

The major events this quarter (with associated grading components) are described below. Note that 85% of your grade will be derived from the main “deliverables” associated with

the milestones above, while 15% will come from your notebook and final report. Separate handouts will provide more details on the exact nature of the deliverables and the grading scheme for each deliverable. As always, the latter due dates may be adjusted to cope with the realities of our progress.

1. Onsite Mobility Demo

- **Date:** *Wednesday, January 19, 2011, 9:00 a.m. (Beckman Mall)*
- **Description:** This will be similar to the mobility demo that was conducted at the end of the Fall term. The only difference will be the venue and the size of the terrain. This will give you a chance to address issues that arose during the last demo and start getting you acclimatized to the contest venue.
- **Grade:** 10% of your overall ME72 (b) grade
- **Grading Contributions:** We will assess the ability of your vehicle to navigate the terrains and the thoroughness of your design.

2. Critical Design Review (CDR)

- **Date:** *Friday, January 28, 2011, 9:00 a.m. (301 Thomas)*
- **Description:** Like the Preliminary Design Review last term, each team will meet individually with the class instructors. The purpose of the CDR is to present the final design and the final set of design analyses, and the prototype.
- **Grade:** 15% of your overall ME72 (b) grade
- **Grading Contributions:** We will assess the thoroughness of your design and analysis and design report (preliminary). The design report will contain the following elements: A cover page containing a title, names of team members, course name, term, and date of submission. The main body of the report shall contain the following: objective, materials, approach (design analysis, construction methodology), results and discussion, summary, and references.

3. Scoring Subsystem Demos:

- **Date:** *Friday, February 11, 2011, 9:00 a.m. (Beckman Mall)*
- **Description:** On this date each team must demonstrate the scoring capabilities of at least one of their vehicles. The contest regulation terrain and contest area will be available during this test. One of your vehicles must demonstrate its ability to gather recyclables and deliver them to a scoring bin. The three minute time limit will not be enforced. You will also not have to compete against another vehicle.
- **Grade:** 15% of your overall ME72 (b) grade.
- **Grading Contributions:** We will assess your ability to efficiently gather scoring items as well as the reliability of your method to place the recyclables in the scoring receptacles. We will assess your team's ability to smoothly transition

between all of the different contest behaviors, as well as the ability of your system to balance all of the competing demands on your vehicle (s).

4. Mock Contest:

- **Date:** *Friday, February 25, 2011, 9:00 a.m. (Beckman Mall)*
- **Description:** We will carry out a mock contest on this date, where each team will be expected to compete twice against another team. The contest guidelines on system set-up and recovery will be loosely enforced. As this mock contest occurs two weeks before the actual contest, its main goal is to test the readiness of your system, and to help each team assess what modifications are needed to prepare their system for operation in the actual contest.
- **Grade:** 15% of your overall ME 72 (b) grade.
- **Grading Contributions:** Is your prototype robust enough to withstand the expected rigors of the actual contest? Have you paid attention to all of the details that will help you have a competitive entry? Have you improved your system's performance compared to the first system trial? Does your device work smoothly within the contest environment?

5. Actual Contest:

- **Date:** *Tuesday, March 8, 2011, 1:00 p.m., (Beckman Mall)*
- **Grade:** 30% of your overall ME 72 (b) deliverables grade
- **Grading Contributions:** What is the quality of the final design concept that was entered into the competition? What was the quality of the actual contest device? Was the device easy to set up and deploy? Did it perform well with respect to your predictions? Did it perform well in the absolute sense?

Design Notebook and Final Report:

- **Date:** The notebook and final report must be turned in by 5:00 p.m. on the last day of finals.
- **Grade:** 15% of your overall ME 72 (b) grade.
- **Grading Contributions:** Did you keep an effective documentation of your projects progress? Does the final report show proof of a clear design and building logic?

Like ME 72 (a), the grade assigned to the team on each team-based deliverable is the grade received by all team members.

Course collaboration policy. We will continue the collaboration policy of the first quarter. That is, we encourage students to discuss the competition and the intermediate milestones with other students and with the class instructors and T.A.s. However, the deliverables described above should come from individual and team efforts.

**ME 72b, 2011
Schedule**

Date	Time	Event	Location
01/05/11	9 am	Organizational Meeting	TOM 306
01/19/11	9 am	Mobility Demo 2	Beckman Mall
01/28/11	8-11am	Critical Design Review	TOM 301
02/11/11	9 am	Scoring Demo	Beckman Mall
2/25/11	9 am	Mock Competition	Beckman Mall
3/8/11	1-3 pm	Competition	Beckman Mall
3/9/11	TBD	“Rain-out Day” Competition	Beckman Mall