Meeting Goals and Agenda

Goals

• Provide an overview of the 2016 Formula SAE Electric competition
• Review the course structure for CS/EE/ME 75 and describe how to participate

Agenda

12:05  Goals, Agenda, Notetaker
12:10  2016 Formula SAE Electric review (Rob Anderson)
12:20  2015 CSVC proof-of-concept activities (Rob Anderson)
12:30  CS/EE/ME 75 course overview and organization (Richard, Guillaume, Azita)
12:50  Q&A
12:55  Adjourn

Notetaker: ______________________

• Record notes and action items from meeting; post on confluence
Formula SAE

• Competition Background
  • Scope
  • Purpose
  • Events
    • Technical Inspection
    • Dynamic Events
      • Acceleration- 75m in 4.0s
      • Skid Pad 2 x 00 (30m diameter) in 5.5s
      • Autocross - 800m in 70s
      • Endurance – 22km – 4 hours (30mph)
    • Braking
  • Static Events
    • Design Report
    • Business Report
    • Cost Report
CSVC Background

- Formed Fall 2014
- 1st Year
  - Power-train prototyping on existing frame
    - Motors
    - Controllers
    - Batteries
    - Frame Modifications
  - ME 100 – 8 students
  - SURF – 3 students
- 2nd year
  - IPT: Integrated Product Team
  - Summer – planning for CS/EE/ME 75
  - Build complete FSAE Electric Vehicle
- Future work
  - Fuel Cell or other types of vehicles
  - Smart Transportation
  - Autonomy
  - Sustainable Charging
System Architecture
**Project/Course Timeline**

**Summer**
- Project organization
- Team strategy
- System architecture
  - Subsystem def'ns
  - Preliminary req'ts
- Funding plan
- Facilities plan

**Fall**
- Design studies
- Subsys selection
- System model/FMEA
- HIL lab setup
- MT: review system → subsystem req’s
- FN: review system → subsystem designs

**Winter**
- Frame construction
- Subsystem prototyping (HIL)
- Subsystem integration
- First drive
- MT: preliminary design review (with data)
- FN: critical design review (against specs)

**Spring**
- Optimization
- Testing
- Competition practice
- MT: mock competition (at Caltech)
- FN: public demonstration

**Dates**
- 8 Oct: SAE team registration
- ~2 Nov: Notice of intent due
- ~4 Jan: Business Plan FMEA
- ~1 Mar: Structural equivalency form
- ~31 Mar: Impact attenuator + cost reports
- 15-18 Jun: SAE RACE WEEK

**Notes**
- 8 Oct SAE team registration
- ~2 Nov Notice of intent due
- ~4 Jan Business Plan FMEA
- ~1 Mar Structural equivalency form
- ~31 Mar Impact attenuator + cost reports
- 15-18 Jun SAE RACE WEEK

---

Richard M. Murray, Caltech CDS

CS/EE/ME 75, 28 Sep 2015
## CS/EE/ME 75 Organization

### Integrated Product Team (IPT)

- **Project lead engineer:** Rob Anderson  
  **Technical lead engineer:** Jake Harmon

<table>
<thead>
<tr>
<th>Mechanical</th>
<th>Energetics</th>
<th>Operations</th>
<th>Support</th>
</tr>
</thead>
</table>
| **Instr:** G. Blanquart  
  **TA:** Joseph Bowkett  
  **UG lead:** Evan Sloan | **Instr:** A. Emami  
  **TA:** Cibele Halasz  
  **UG lead:** Santiago N | **Instr:** R. Murray  
  **TA:** Noah Olsman  
  **UG lead:** Anup Kishore | **Instr:** Fromer  
  **TA:** Shenghan Yao  
  **UG lead:** Mark Lorden |
| • 15-25 Caltech ug  
  • 2-4 Art Center ug/gr  
  • 2-4 advisors | • 10-15 Caltech ug  
  • 0-2 Art Center ug/gr  
  • 2-4 advisors | • 10-15 Caltech ug  
  • 2-4 Art Center ug/gr  
  • 2-4 advisors | • 25-35 Caltech ug  
  • 5-8 Art Center ug/gr  
  • 2-4 advisors |
| • Structural frame  
  • Body shell  
  • Drivetrain  
  • Driver interface | • Power  
  • Hardware  
  • Firmware  
  • Software | • Systems modeling  
  • Safety procedures  
  • Test procedures  
  • Computing systems | • Fund raising  
  • Communications  
  • Facilities/equipment  
  • Outreach/events |

### Team assignment guidelines

- All CS/EE/ME 75 students on 1 subsystem team (blue)
- Students w/ 6-9 hrs/week on additional supporting team (non-technical activities)
- IPT role requires 9 hrs/week; rotate assignments each term
CS/EE/ME 75 Goals, Objectives and Schedule

Fall 2015 Goals

- Build a highly effective team with the skills and insights required to build an electric vehicle from scratch
- Complete a design that is compliant with the rules and will win the Formula SAE Electric competition

Objectives

- Train all CS/EE/ME 75 students in safety procedures and create protocols required for safe testing, operations
- Create compliant designs for all components and review design choices by the end of the term
  - Midterms: clearly defined requirements for each component (performance, cost, weight)
  - Finals: compliant design, with evidence of viability (prototype, vendor quote, etc)
- Monitor system-level requirements and budget allocations for weight and cost of components as design is evolving
- Make enough progress in first term to build complete vehicle by end of second term

Schedule

- Weeks 1-4: team formation, planning, requirements
- Midterm: requirement review
- Week 6-10: baseline design, validation, documentation
- Final: design review

Milestones

- 5 Oct: teams formed; collaboration tools working
- 12 Oct: subsystem teams know SD rules + baseline status
- 27 Oct - 3 Nov: subsystem requirements review
- 3-8 Dec: subsystem design review
- 11 Dec: final documentation due
- 4 Jan: Business plan and FMEA due to SAE
CS/EE/ME 75 Course Administration

Class homepage: http://www.cds.caltech.edu/~murray/wiki/CS-EE-ME_75

Course meetings (first term)
- Team meetings: time and location TBD (1 hr, weekly)
- Division meetings: time and location TBD (0.5-1.5 hr, weekly)

Units (default = 3; file signed add card by end of week 3 to change)
- 3 units: participate in one design team; meetings + help with design, presentations
- 6 units: additional design work and/or participation in second (non-design) team
- 9 units: even more design work; required for all team rep roles

Grading
- 20% Homework (weeks 1-4 only)
- 20% Subsystem presentations (team effort)
- 40% Documentation of work for the term (individual writeup)
- 20% Participation (attendance, discussion, contributions)

Collaboration policy: full collaboration required. (Write up your own final report)

Signup sheets due Wed (30 Sep) at 11 am in box outside 237 Gates-Thomas