

# Making a Required Course for Non-Majors Interesting for Students: Lessons from Fall 2012 Surveys

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## Background

- Today all engineers use Electrical Engineering (EE)
- Non-EE majors are required to take EE course
- Some students see it as unnecessary burden

## Strategy

Combine research in Engineering Education with practical teaching of a large service course (EECS 314), in order to:

- Monitor and influence the students' perception of the value of learning EE for success in their fields of major
- Gradually evolve the course to make it more valuable for students.

## Research questions

- What are the students' expectations of taking EE course?
- How and why do their attitudes to learning EE evolve?
- What aspects of learning EE do students find valuable?

## We blend quantitative and qualitative methods:

- Obtain statistics on multiple-choice questions
- Collect open-ended, essay-type answers

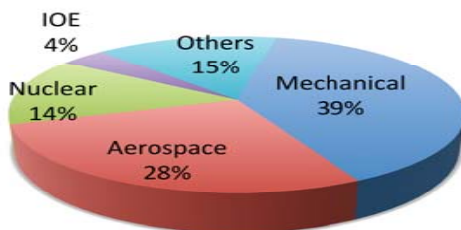
## Research tool

- Create surveys focused on the specifics of the course
- Use professional version of SurveyMonkey to maintain anonymity of respondents

## For the Fall 2012, we changed the course to provide:

- More focus on Lab projects (required 8 instead of 6)
- New Lab experiments, related to non-EE applications
- Reduced HW load; Lab-based questions in exams

**Fall 2012 Enrollment = 154**



## What are the students' expectations and goals?

- Survey was given and collected before the semester started
- ~120 respondents
- Listed are % of respondents who **Agree** or **Strongly Agree**
- The numbers do **not** add to 100%, which implies mixed feelings

## Question: Why have you decided to take this course?

- This course is required as a pre-requisite for my major courses **82.9%**
- I always wanted to learn about electronics **70.3%**

## Question: What goals do you have for this course?

- Learn hands-on skills that might be useful for my major courses **95.0%**
- Learn about electronics to become a more intelligent user of it in everyday life **94.1%**
- Although I am not really interested, I want a good grade to maintain my GPA **50.8%**
- Learn the introductory material in this course and then take more EE courses **15.9%**

## Student Interest in Course Material

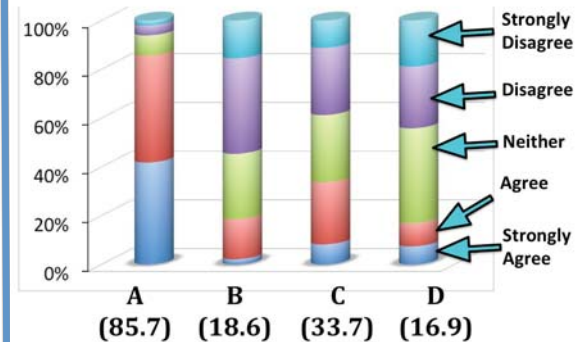


## What fosters students' interest in the course material:

- Real-life applications; building useful circuits in the Labs
- Clarity of concepts; examples of EE in non-EE fields
- Enthusiasm of instructors (both the faculty and GSIs)

Engineering majors are eager to learn useful, applicable things: **convince them of usefulness of the material – and they start to appreciate their learning!**

## Scheduling HW before Labs? Yes!



After 3 Labs and 4 Homework assignments, we asked the students about their preferred sequence of learning:

- First learn the theory in lectures and homework, then do the lab
- First observe something new in the lab, then learn the theory
- Learn the theory (do HW) and do the lab at the same time
- The exact sequence does not matter

**The students voted overwhelmingly in favor of (A):** the numbers above show the percentage of (Agree or Strongly Agree)

## "The most interesting things I learned were in the lab."

When we asked about the most interesting parts of their learning of EE, many students emphasized the Labs, hands-on skills, confidence in building circuits that have useful functions, etc.

## Recipe for success:

- Create interesting Lab projects
  - Make them relevant to non-EE fields
  - Emphasize that strategies and skills are transferable to a wide range of projects
- and you will win the students' hearts!

## Acknowledgments

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## Future research plans:

Investigate the students' motivation and learning, in addition to their interest in the course material