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) courses
- 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 GSI)

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!

A (85.7) B (18.6) C (33.7) D (16.9)

“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!

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Future research plans:
Investigate the students’ motivation and learning, in addition to their interest in the course material