

Refashioning the First Year Introductory Course on Communications Skills and Engineering Practice

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Like most engineering colleges, the School of Engineering and Applied Science (SEAS) at the University of Virginia confronts two novel curricular challenges. We must reconfigure our programs to conform to the ABET 2000 proposals while also seeking to boost institutional productivity in response the combined challenges of unalterable staffing and funding levels and anticipated enrollment growth. This paper outlines how the Division of Technology, Culture and Communication at SEAS plans to refashion its introductory writing and speaking class (TCC 101) to meet these challenges. Our goals are simply put:

- accomplish more teaching with fewer resources
- improve the quality of our instruction in writing and public speaking
- promote students' awareness of modern social, economic, and political issues relating to engineering practice
- increase students' ethical awareness
- decrease the attrition rate of first-year students (chiefly a problem of transfers into UVA's liberal arts college)

At present, TCC 101 is a labor-intensive course, taught only in the first (Fall) semester, that divides 400 students into 12 sections (roughly 100 students annually are exempted from the class with high school AP credit). Each section thus has one professor and 33 students. The sections do intensive writing and speaking exercises that are hung on a curriculum whose intellectual content varies with the interests of each professor.

To respond to the present challenges and meet our ambitious goals, we are proposing a new structure for TCC 101. This plan calls for a single professor teach the class with the assistance of six teaching fellows (Education School graduate students in the Masters in Teaching degree program). All 500 students in the entering class will take the course -- divided equally between the Fall and Spring semesters. The professor will give one lecture each week to 250 students, largely on topics that place engineering practice in its professional, ethical, political, economic, and social contexts (more below). That lecture will also serve as an intellectual framework upon which to hang communications instruction. Then the teaching fellows will take each section (two sections per fellow, 21 students per section) for two meetings a week. The sections will do intensive work in writing and speaking -- on technical writing genres and on issues raised in the weekly general lecture.

The professional orientation of the weekly lecture will include issues like:

- the disciplinary character of engineering practice
- the history of engineering
- the relation of engineering to business, esp. in a corporate environment
- ethical considerations in engineering
- relations between government and engineering practice.

Course readings will include such authors as Arnold Pacey, *The Maze of Ingenuity* or David

Billington's *The Innovator*. To complement these historical studies, students will also subscribe to *Newsweek*. Reading a weekly newsmagazine will inject current issues relating to engineering practice into the course's lectures as well as providing a vehicle for writing, researching, and speaking exercises in the sections.

In my own model of the new course, two large multi-faceted projects will structure the semester. During its first six weeks, students working in pairs will conduct the "Research Interview Project" (RIP). Under the project students choose a specific discipline of engineering (most choose their prospective major), they conduct library research on that topic, and they interview an engineer in that field. The interview and ancillary library research form the basis for a number of further composition and speaking assignments. The RIP will help arm students with the perspective needed to declare their majors.

The second major project, tentatively called "Perspectives on Engineering" (POE), will occupy the last eight weeks of the semester. For the POE project, each discussion section will break down into five teams, with the teams focusing on different engineering disciplines (civil, mechanical, etc.). Working from a list provided by the professor, every group will select a triad of technologies to research and report upon. The triads will include an example drawn from history, a problematic or failed case (either historic or modern), and a contemporary example of a technology -- all in the same engineering field. Through research, writing, and speaking assignments, the POE should: give students a deeper understanding of their probable major fields, trace the relations of those fields to other disciplines and professions, provide a basis to discuss ethical considerations in engineering practice, and acquaint students with the real world challenges and accomplishments of engineers.

In combination, these elements should result in a course that increases the quantity and the quality of instruction, while releasing faculty for other research and teaching duties and lowering overall staffing costs. The class will also promote students' abilities in six of the eleven target areas outlined in the ABET 2000 guidelines. We will literally do more with less.