

Introduction – Sheila Tobias

For decades now, encouraged by the National Academy of Engineering, NSF, and other bodies, higher education has been committed to expanding *technological literacy*. What is *new* and defines this collection of case examples is a growing consensus that “technological literacy” has to be grounded in the *intellectual discipline of engineering* (Grasso and Duderstadt.)

Much has been done in the realm of “Tech Literacy” that remains relevant. For background: see *Technologically Speaking: Why All Americans Need to Know More about Technology* (2002) and *Tech Tally: Approaches to Assessing Technological Literacy* (2006). At a gathering in 2008 of ~40 college educators sponsored by the NSF, the NAE, and the ASEE, attention was given to *types of courses* (general, history of, impacts of, single-technology focused) *types of student outcomes*, (knowledge, capabilities, decision-making) and means of measuring achievement on each of these outcomes. Since 2010, however, the fastest growing ASEE division is the *Technological and Engineering Literacy* Division, now numbering over 300 members. And as our survey documents, engineering departments and schools are not just fulfilling but initiating “Tech Requirements”.

But as is so often the case, just as some number of college engineering professors might have been poised to begin tracking existing courses and programs and launching new ones, the nation’s priorities shifted (once again) to K-12. The publication of *Rising Above the Gathering Storm*, in 2007 had an effect similar to Gerald Holton’s *A Nation at Risk* in the early 1980s which focused attention on the science gap, starting in the lower grades.

Another setback occurred when the National Academy of Engineering itself began to devote significant effort to “Public Perception of Engineering” rather than public *understanding* of engineering ideas. See *Changing the Conversation*.

Not that engineering-enhanced liberal education – the unifying theme of this collection of course models – would have been easy to launch in any era. There is competition among departments for student FTE’s, resistance on the part of non-engineering students to anything called “engineering,” and pressure on enrollments in the last half decade making it more difficult for department heads and deans of engineering to accommodate non-engineers. Also we find continuing confusion (even competition) between “Engineering Literacy” and “Technological Literacy,” a legacy of the terminology introduced by the Sloan Foundation in the 1980s. (See “Revisiting the New Liberal Arts” in the Background section of this site.)

Yet, in as decentralized a sector as higher education, there has been response to these developments by individual faculty members, individual deans, and even in some (fewer) cases provosts and presidents (some of whom are engineers by training). And, as this collection illustrates, there have been experimental courses, some new, some long-standing. What has been missing is the kind of synergy that might have come from reporting more broadly what is going on at the grass roots: how many and what *kinds* of new courses are on the boards; in other words, where faculty are inventing, deans are approving, and, at least as important, students are responding to “about engineering” courses for non-engineers. One way new undergraduate programs propagate (Black studies, women’s studies, environmental studies) is by publicizing the new. There can’t be synergy, as evidenced by the programs detailed in this collection, if local course designers don’t have a means of knowing *what’s happening elsewhere*.

This study, funded by the Teagle Foundation and supported by the ASEE, is meant to change that. In only seven months of inquiry, more than a dozen interesting, varied, and so far successful (in terms of faculty commitment and student enrollment) courses and programs have been identified. Not surprisingly, given the creativity of college and university faculty and the uniqueness of their institutional cultures, these new courses and programs stem from no single source. Rather, they encompass a wide variety of initiatives: from the dream and long-term commitment of a single faculty member (Princeton), to the initiative by a college president (Wesleyan), a college-wide commitment to including Engineering in a newly constituted set of General Education offerings (Univ. of Maryland), and to a university-wide one-course Tech graduation requirement at Stony Brook *originating* in the College of Engineering and Applied Sciences.

Two women’s colleges, Smith and Wellesley, with relatively new engineering concentrations for their students, open their introductory and advanced engineering courses and their hands-on workshops to non-engineering majors, as their way of communicating that engineering is too important to be restricted to majors.

We have discovered new courses in unfamiliar surroundings, such as the Honors Program at Delaware, where “Engineering in the Modern World” is taught in a writing-intensive mode, Virginia Tech which is introducing a new course, Citizen Engineer, for non majors, and we’re tracking new engineering minors as they come on board.

Surely, we will have missed many innovative efforts as part of this inventory effort. The advantage of having a web presence on ASEE is that, as these resources are downloaded and discussed, we will get news of programs we’ve left out. Our commitment is to continue collecting and promulgating the set. We hope everyone logging on will join us in enlarging and enhancing this inventory.

References Cited

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