Curriculum Committee
Minutes

April 20, 2007

Attendees: Tom Doeppner, Chad Jenkins, Franco Preparata, Steve Reiss, John Savage (Chair), Warren Schudy

Absent: Claire Kenyon

Guest: Philip Klein

1. Report of the Undergraduate Science Education Committee

The committee was pleased to welcome our colleague Philip Klein who is a member of this committee. We reviewed the recommendations of the committee, which are shown below. Our reactions to them follow.

(a) **Recommendation:** Add faculty-taught sections from other disciplines to existing introductory courses. Establish new multidisciplinary introductory courses that integrate fundamental concepts from different fields.

(b) **Recommendation:** Revise introductory and second-level course to incorporate research into the student experience.

(c) **Recommendation:** In addition to the other curricular recommendations, expand freshman seminar offerings in STEM fields.

(d) **Recommendation:** Create a pool of resources to support curricular innovation that would be allocated to departments on a competitive basis for periods of 1-3 years. These resources would include funds to free up faculty time during the academic year and the summer, new graduate TA positions, undergraduate TA positions, funds for new laboratory and teaching equipment, funding for technical staff to support undergraduate research.
(e) **Recommendation:** Increase the number of university funded undergraduate summer research positions by 50 per year, with a target total of 450 across all fields for the year 2012 if student demand and faculty capacity in fact support continued increases.

(f) **Recommendation:** Increase the stipend for each UTRA and providing students with two options: a stipend of $4000 or a lower stipend plus subsidized housing on-campus (for example a $3000 stipend with free housing). Also review the ability of students on financial aid to participate in summer research programs followed by alleviation of financial barriers.

(g) **Recommendation:** Eliminate the $500 cost-share, and provide support for reasonable research expenses that are not easily supported on external grants.

(h) **Recommendation:** Create an Undergraduate Science Education and Outreach Center to help students find course support, concentrations, departmental academic advisors and research opportunities, while also providing support for university-wide student groups, study skills programs, a potential pre-Freshman summer program, course study groups, and grad school and career advice. The center would also facilitate interaction of faculty across departments, provide information and support for educational grant writing, and be a point of contact for local schools.

(i) **Recommendation:** Help faculty implement study group models in their courses. The multidisciplinary sections described in Recommendation 1 would also be very effective. Where absolutely necessary, one-on-one undergraduate tutoring should still be provided, but problems with quality and availability need to be fixed.

(j) **Recommendation:** Enhance support for student groups, in particular university-wide groups for women and minority students. Strengthen efforts to recruit and retain women and minority faculty and graduate students. Develop activities and programs that link undergraduates with graduate students, faculty and alumni outside of the classroom.

(k) **Recommendation:** Consider the development of a pre-Freshman summer program that would offer a variety of options: a brief orientation to courses and research in the STEM fields at Brown; short courses emphasizing study skills; Summer Studies courses in STEM disciplines for students who wish to improve their backgrounds; and group research courses.

(l) **Recommendation:** Ensure that each freshman has a faculty advisor and a Meiklejohn who match their specific science interests.
Recommendation: Develop a university-wide plan for collecting data on student retention to better inform refinement of recommendations for STEM education.

Recommendation: Develop more opportunities for campus-wide discussion of strategies to reach students with different learning styles, in conjunction with the Sheridan Center.

Recommendation: Develop student-run research days at Brown, for example an undergraduate poster session in October focused on access for first-year students.

Recommendation: Improve the marketing of Brown’s strengths in the STEM fields on the web, in printed materials, and through alumni interviewers. Selectively bring faculty on visits to targeted groups high schools, investigate web-based outreach to high school science faculty nationally, and encourage more undergrads in STEM disciplines - particularly in the physical sciences - to staff campus tours and other admissions activities.

Recommendation: Work with these programs to systematically draw students from local schools into the Brown admissions process by identifying particularly talented students for the Admissions Office, developing a science club program that brings top sophomores and juniors to Brown for science and college prep activities, hosting informational sessions for local high school science and math teachers and guidance counselors, providing Brown as the site for state-wide science activities such as the Science Olympiad.

Recommendation: Work closely with Brown Summer Studies to channel top high school students into the admissions process by identifying particularly talented students from Summer Studies courses, providing Summer Studies scholarships for select students, and encouraging more STEM-related courses and programs within the existing Summer Studies Pre-College program.

Recommendation: Expand the existing practice of having faculty comment on admissions folders in STEM fields.

After reviewing these recommendations we focused our attention on the following issues:

The Pipeline

We applaud the efforts to increase the general awareness of the important work being done at Brown in STEM areas through promotion and marketing.
(b) Research and Instruction STEM Areas

We believe that it is very important that undergraduates learn to bridge the science and non-science cultures. In particular, we would like them to become aware of the many beautiful results developed in STEM areas. We encourage first-year students to take courses in these areas. We also encourage our colleagues to teach courses designed to attract students to careers in science and technology.

We are skeptical about involving undergraduates in research during their first two years at Brown. We don’t believe that they have the requisite background to engage in such activity. We recommend that students not expect to participate in research until they have taken 100-level courses. While we acknowledge that many fields have important multidisciplinary components, including computer science, we are not eager to introduce topics from related courses into our introductory courses unless they fit naturally.

(c) UTRA Funding

We are unsure whether a significant expansion in UTRA funding is necessary. We can understand the interests of colleagues who desire to have student support for their research during the summer but also appreciate the desirability of students leaving campus during the summer to have experiences elsewhere. Concerning UTRA funding, we subsize the $3,000 stipend up to the level of about $5,000 from our funds so that we are competitive.

(d) Undergraduate Science Education and Outreach Center

Some reservations were expressed about this concept. We asked whether most of the functions listed for this center weren’t activities that should be handled by the Dean of the College’s office.

2. Proposal to Crosslist an Engineering Graduate Course on C++

Joe Mundy of the Division of Engineering is offering Scientific Programming in C++, ENGN 2912B next fall. Philip Klein has asked that we consider crosslisting this course as a computer science course.

Tom Doeppner reported that that he spends about one month in CS36 on C++ teaching all the topics in Joe’s course except for the material on scientific computing, which appears not to be a significant component of his course.

We discussed at length whether to allow substitution of the new Engineering course for CS36 or one of our other courses as well as whether to permit graduate
credit for this course. We decided that this course could not be used to satisfy any of our undergraduate degree requirements nor could it be used for graduate credit in this department.