CCGB Meeting Agenda, September 28, 2007

1. Approval of minutes
2. Undergraduate announcements
3. Distribution of ABET review duties to committees [Gries]
4. Reports from committee chairs on recent/current business.

CCGB Minutes, September 14, 2007

Ex-Officio: B. East, R. Robbins, L. Schneider
Other: L. Bonassar, C. Pakkala, N. Peterson, R. Harris-Warrick, J. Sparks

Approval of Minutes: The minutes of the 8/31/07 and 9/7/07 CCGB Meetings were approved as written.

Undergraduate Announcements: None

Discussion of Introductory Biology: R. Harris-Warrick stated that a task force was set up between A&S & CALS by the deans of the two colleges to address the curriculum in biology. The focus was on biology majors and the related fields. The task force has addressed issues to determine how to satisfy their constituents. They looked at introductory biology and planned to reduce class size and promote active learning to try and get students to remember something from introductory biology. They interviewed faculty who teach biology and surveyed groups of former students who don’t remember any biology from their introductory class. They came to the conclusion that introductory biology at Cornell needs to be revamped.

For non-biology majors, they want to continue an introductory biology course (a one-year course) but they want a shorter list of topics, studied in more depth, so students learn something. They plan to reduce the size of classes to increase interactions between TA’s and faculty and students. The plan is to have the same curriculum taught in the two introductory courses, but principles will differ between the two introductory biology courses. There will be more quantitative stuff for engineers. The task force understands that biology would be useful in some engineering departments but not in others. Biology majors will not take the introductory biology sequences, but instead will take a larger number of core courses (which are independent of each other).

The Office of Undergraduate Biology came up with an enrollment number: If the enrollments of the 3 introductory biology courses are combined, on average there are about 50 engineering students per semester in those 3 courses.

B. Fisher said that she realizes that engineers are the largest group of non-physical science students taking biology. A. Zehnder said that 50 students per semester isn’t a small number for a non-required course. J. Bartsh stated that probably 35 of the 50 students are BEE majors.

E. Fisher stated that at the task force meeting held a few weeks ago with engineering faculty, there was an idea that certain engineers would be served by taking core biology courses with biology majors (especially BME minors). The task force thinks that there are two classes of engineers who would take biology: Some taking classes in the biology core but some taking 1 or 2 non-core biology courses. (There are two questions: Do we think a more seriously biology-oriented engineer would be served by taking core courses? For those not taking core courses, is the 3B option highly desirable, or are we indifferent?)
L. Bonassar stated that he thinks the core courses will be what BME recommends for students who do their minor. There are about 70 students graduating this year with the BME Minor. BME will do info sessions and ENG 150 classes to help students figure out if they want to do the BME Minor, and if so to make the right choices of biology courses.

E. Fisher said that it would be good for people representing departments who have a large # of biology-oriented students to identify themselves. W. Philpot stated that CEE shares an environmental major with BEE, and for that major and the environmental concentration in CEE they require 1 semester of biology. Students have taken random courses in the past. Engineers do not fit well with the approach to teaching standard biology due to poor memorization skills. They are better at taking principles and working from them. It is great to have a biology course geared toward engineers, but it would be better to change the mode of teaching so it isn’t a classical presentation of biology but rather geared toward how engineers think.

J. Bartsch stated that he feels the Environmental Engineering students should have 1 year of biology in the curriculum but any curriculum changes must wait until after ABET accreditation in 2008. Most of the 50 students currently taking biology are in BEE. If more biology topics and more depth is to be covered, where will we fit this into the (Engineering) curriculum. He doesn’t think biology is poorly taught. The quantitative aspects resonate with many students. Engineers don’t wreck the curve for pre-meds, contrary to what the pre-meds say. Accommodating the needs of pre-meds is important. BEE’s major will be most impacted with any biology changes. The new course structure would be very important. He is a proponent of “serious” biology, rigorous Biology like the current BIO 101-104 is necessary for BEE students.

R. Harris-Warrick stated that for biology majors AP credit will no longer be accepted. Selected core courses might be more appropriate for BME students and BEE students. If that’s the case, the Biology Department won’t teach Introductory Biology for Physical Scientists.

M. Duncan stated that ChemE has had a biology requirement for 5 years and they stress more advanced classes. For instance, ChemE 288, Biomolecular Engineering has become more popular and contains biology. It has an analytical approach to how to design biological systems. The course doubled in size last year.

B. Isacks stated that there are several tracks in Geological Sciences/Science of Earth Systems. One semester of biology can be replaced by more math. Students can get away with 1 semester of biology; sometimes with organic chemistry. Paleontologists take a more serious load of biology. J. Bartsch said that biochemistry and microbiology are important in BEE. They are focusing on first-year biochemistry. Students tend to take auto-tutorial biology due to scheduling issues. L. Pollack said that the Chemistry Department is evaluating when they should teach organic chemistry.

E. Fisher said that for those people who described biology requirements in their department, if changes are implemented without quantitative biology, she asked where they would send their students. B. Isacks said that he would be delighted with the quantitative track (3B), but it would depend on the level of interest of their students. W. Philpot said that biochemistry and molecular biology would be the most interesting to their students. They would direct students to the physical sciences version—3B. J. Bartsch said that BEE would want to see how this works out, but a more quantitative approach looks like a good option. He hopes that students could also take serious biology—specifically the pre-meds.

R. Harris-Warrick said that pre-meds don’t need to be biology majors, but they would take biology, biochemistry, and genetics. They would take 3A or 3B as a year of introductory biology. Biology majors
would take 5 core courses. They would still offer a year of introductory biology—they are not taking away that option. J. Sparks said that for universities who use a core system, 2 courses satisfy the introductory biology requirement. E. Fisher asked if the pre-meds take 2 courses. L. Pollack replied that they have 1 year of introductory biology. J. Sparks added that they take genetics and 1 other course also. L. Bonassar said that biochemistry and cell chemistry are 300-level classes—the equivalent of taking introductory biology and 2 courses from the core, which is similar to what’s going on now. R. Harris-Warrick stated that he likes the degree of depth in the current biochemistry courses. The biochemistry courses won’t be changed much and they won’t become simpler.

L. Bonassar said that the BME students would take some subset of the biology core, but students won’t have time for 5 core courses. They could take 2 core courses and 3A or 3B. If the BME Minor was completed, the students would complete the pre-med requirements. BME wants their students to take the core courses instead of 3A or 3B. Some students are looking for a terminal biology class, so 3B would be good for them. For a launching pad to take other biology courses, they would be well advised to take the core.

L. Pollack stated that for students who have been good in math and physical sciences who want to take biology, introductory biology has been viewed as a launching platform. AEP sees students who want to take introductory biology, and we need to serve them. This is a once in 20-year revision. It might be a small number served right now, but we need to look toward the future—more students might want to explore biology and would be served by the 3B option.

S. Baker said that many engineering students would not be served by 3A due to a lot of memorization. R. Harris-Warrick stated that 3A is being taught and is a launching board for everyone. Biology hopes to make these courses better for everyone and wants them to continue to serve as springboards as they are right now.

L. Bonassar said that BME wants students to have a complete experience unto themselves for option 3A or 3B. R. Robbins asked whether the expectation is that students know about these options as freshmen. The core in engineering is pretty full already. It is tough for students to make this decision before they come to Cornell. R. Harris-Warrick said that the majority of engineers taking introductory biology are freshmen.

J. Sparks said that it is confusing to him about what the difference is to engineers between 3A and 3B. He thinks that the differences aren’t that great other than it would be more quantitative in 3B. S. Baker responded that this year engineers were required to take CHEM 209 rather than CHEM 207. CHEM 211 was taught in the past, but it covered too many topics, at insufficient depth. The Chemistry Department made the observation that students in introductory chemistry didn’t want engineering students in their class because they felt they were blowing the curve. Students have a higher expectation for quantitatively solving problems, so they agreed to take the same subject matter in a different course with more of a focus on calculus. L. Pollack said that currently the same type of situation exists with biology. She brought that philosophy to the biology task force. She doesn’t know exactly what would go in 3B. We reviewed introductory biology at other schools, there is a biology requirement at other universities, and we need to keep up with that here in engineering.

J. Sparks stated that he would be more comfortable in mentioning what 3B would contain when compiling a report. S. Baker said that a key feature is an assumption of a level of math training that engineers have compared to what other students have.
R. Harris-Warrick said that he wants to add a discussion section in biology. The section would be different in 3B vs 3A. Specifically, there would be more problems oriented toward math. General concepts in lecture would be different but less different than discussions. D. Gries said that currently calculus is done in a collaborative environment.

E. Fisher said that she noticed in the report that 3A and 3B have the same topics. She wondered why this is needed. R. Harris-Warrick responded that these are the basic biological concepts in an introductory course. The understanding is that it is difficult for engineers to take more than 1 semester of biology. They would have difficulty coming up with a course that could cover introductory biology in 1 semester. E. Fisher said that many engineers are taking 1 random semester of biology.

L. Pollack stated that she sees this as a wonderful opportunity for the Engineering College. Biology faculty are at a point where they could help design a course. They would select topics that cover biology. This might morph into a required biology course for engineers in 10-15 years when another curriculum revision is done. S. Baker said that the Curriculum Task Force looked at other schools to see what other schools were teaching biology. They came to the conclusion that a biomedical engineering course existed at some schools. If we could identify a core of knowledge that engineers should know in biology, we would be the first school to do that.

R. Harris-Warrick said that an option would be to have some collaboration with the biologists and engineers—maybe co-teaching. Maybe a course could be taught in engineering—possibly in BEE. The biologists would be happy to be consultants or do team teaching. L. Bonassar agreed that there would have to be some type of collaboration between the two colleges. If putting together 2 semesters of biology, it would be good to work together and find a 1-semester course geared toward certain engineering majors and 1 semester geared toward other engineering majors. R. Harris-Warrick said that 3B won’t be huge to begin with, and there will probably be only 75 or 80 students in that class initially. E. Fisher suggested that departments identify topics by priorities and perhaps natural groupings by majors would occur.

J. Sparks stated that the biologists can provide a course with biology concepts, but each major might want to focus on a different area. He asked if the engineers need a broad introductory course or whether they want good introductions to things more important to them. One would be satisfied by the core, and the other would be satisfied with 3A or 3B. S. Baker said that when we re-vamped CHEM, Chemistry asked us what we want, we did a survey, and they decided that we don’t know what we want. So Chemistry ended up choosing the topics.

J. Bartsch said that a course in biology that works for everyone and serves as a launching course should be generic and could then be built onto a major.

S. Baker stated that the Curriculum Task Force discovered that finding room in a schedule for even 1 semester of biology would be tough. The engineering majors already feel constrained with teaching the major courses. It is clear that there will be no chance of obtaining another opportunity to require a course. We want to have a 1-semester course in biology, but 2 semesters are good for a solid introduction. We would rather have half of an introduction that people retain than a whole introduction that nobody retains. R. Bland said that whether or not engineering feels there is room for biology, we could allow students in individual departments to take it. In ORIE students can take other courses in place of physics 214. Maybe they could allow biology to be taken in place of physics 214 also.

The meeting adjourned at 9:00 a.m.