

## Appendix 1

### Summary of Multi-department meeting on the BS requirements: May 6, 2005

**Attendance**, in order of sign-up sheet: Bohn (Chemistry), Lowe (Psychology), Miller (Psychology), Chrobak (Psychology), Auster (Marine Sciences), Salamone (Psychology), Nell (MCB), Cantino (PNB), Hamilton (Physics), Rawitscher (Physics), Leibowitz (Math), Cormier (Physics), Best (Physics), Michel (Chemistry), Schultz (EEB)

The discussion revolved around a requirement for 6 courses of which four must be lab courses, and Biology, Physics, Chemistry, and Math should be included in the choices. Following this summary is a set of amplifications of the discussion promulgated by email immediately after the meeting. No consensus was achieved during the meeting, nor can one be seen by inspection of the email discussion.

**Physics:** Improved offerings by biology would go a long way towards enabling a mandatory biology course

**MCB:** Only proposals that require biology are acceptable. Present BS requirements are outmoded.

**Physics:** The department is concerned that students might avoid doing Chemistry, Physics or Math, if a choice was offered amongst Chem, Phys, Math, Biol.

**Psychology:** Given a choice it is most likely that biology and chemistry would be chosen, although some Psychology majors might prefer physics. Flexibility is preferable. It is not a good idea to require six courses of which two might not be useful in a major.

**Marine Sciences:** Biology is important for every citizen. Might be useful to have an interim set of requirements that might lead to the design of new courses.

**Physics:** BS is a more research-oriented degree. The BA degree is more general, and might be better suited to a biology requirement.

**Psychology:** The BS and BA are not always that clearly distinguishable in some majors.

**EEB:** Basic function of BS is science literacy.

**Chemistry:** American model of education aimed at good citizenship. European model more specialized. One size fits all is not a good idea. The most general requirements should be in the BA not BS.

**Marine Science:** High school biology is not sufficient.

**Physics:** The emphasis in the Physics department is in problem solving skills. Peer institutions should be checked more thoroughly.

**MCB:** Current system is constraining. If biology cannot be incorporated into the BS, then the requirements should be made quite general.

### ***Amplifications of the discussion:***

The following amplifications were emailed to Michel after the meeting:

**EEB:** Here is what I feel the subcommittee is charged with considering: That each department is free to develop its own BS requirements, which must contain seven courses as follows:

-A full sequence of Math 112 etc or 115 etc.

-At least four lab courses in addition (note that chem 124-125-126 would count as two lab courses, not three). No restrictive list of courses from which these courses could be chosen will be provided.

-One additional course.

As I understand it this presents the same course load as the existing requirements, but resolves the impasse between the biology advocates and the 'chemistry defenders', while perhaps leaving the physicists queasy.

**Psychology:** Summary of Psychology's stance regarding yesterday's "revision of BS degree" meeting: The 4 of us in attendance, who I think represent the majority view of our Department, strongly believe that there should be some choice among courses. I think it's safe to say that we prefer the original proposal that the W subcommittee submitted to the CLAS C&C--everyone takes the MATH sequence, then choose 2 out of 3 sequences from CHEM, BIOL, PHYS. Indeed, 2 of us definitely prefer that option (perhaps all 4 of us).

Given the impasse at yesterday's meeting, we don't want to see the choice aspect be lost, which is why we ended up supporting the almost-totally-open-ended choice option. HOWEVER, we must bear in mind several things:

1. The CLAS BS degree is, indeed, offered by CLAS, not by individual CLAS Departments. Each Department has its own additional non-GENED BS Plan of Study. Thus, for each Department to now devise its own set of BS GENED requirements circumvents the intent of the College.
2. Because of #1, I cannot imagine the open-ended option being passed by the CLAS C&C, meaning if that's what we end up supporting when the W-subcommittee meets again, we'll basically send the C&C something that is guaranteed to not pass and end up back where we began.

Now, I observed that among the 3 biologists present, it was only one who strongly seemed to favor the open-ended option i.e. either everyone take BIOL, or make it open-ended. Thus, putting all of the above together, I think it's safe to say that Psychology would most strongly favor the originally-proposed revision to the BS degree in which there are 2 out of 3 options, a proposal that has structure and is not open-ended and Departmentally-determined.

**Physics:** My main comment at the meeting was to call attention to the new peer institutions we wish to emulate. I don't believe sufficient study or attention has been paid to this. We should strive to maintain some quantitative and analytical standards for

the BS degree comparable to our peers. I see no harm, and also some good, in maintaining some well-roundedness and good citizenship in scientific issues, but I don't think BIO 107-108 is the answer to this. A better place would be another revision of gen-ed requirements, but unfortunately the latest round of gen-ed revision consumed many years and probably could not be easily undertaken again. From a preliminary examination of some of our peer institutions (see web links below), it appears to me the well-roundedness criteria often handled by gen-ed type courses in science and society, which seem to be more creatively targeted than what is currently available at U Conn.

It also appears that there are nicely designed BA programs as well as BS programs in the biological sciences at some of our peer schools. The BA solution was almost immediately brought up as a response to the Knecht proposal in our internal Physics C and C committee meetings.

I call attention to our new peer institutions: Minnesota, Missouri, Georgia, and Iowa, and Iowa State, Ohio State, Purdue, and Rutgers Universities (see excerpted article below). Also particularly note the phrase "It also will require the University to push students to graduate in four, rather than five or six, years..." Thinking of the student perspective in the physical sciences, I see a constant course toward making 5 and 6 year BS degrees at UConn, by piling on poorly thought-out and confusing new requirements.

I just started checking on peer institution BS requirements. I don't have all of our full committee member's e-mail addresses handy and I haven't started to sort through this yet, but here are a couple of links I found quickly:

University of Minnesota BS in Biology: <http://www.catalogs.umn.edu/ug/cbs/cbs02.html>  
BS in Biochemistry: <http://www.catalogs.umn.edu/ug/cbs/cbs01.html>  
BS in Biomedical engineering: <http://www.catalogs.umn.edu/ug/it/it18.html>

Umn also has a BA program in Biology, Society and Environment:  
<http://www.catalogs.umn.edu/majors.html>

Umn program in Psychology is a BA program:  
<http://www.catalogs.umn.edu/ug/cla/cla60.html>

Umn Gen Ed -- seems to require some science and culture (well-roundedness stuff for science/society , unlike U.Conn -- can find by poking around Umn site)

Purdue (harder to navigate, but go to the page below and click on "Laboratory Science Requirements for the School of Science")  
[http://www.science.purdue.edu/academic\\_programs/majors.asp#bio](http://www.science.purdue.edu/academic_programs/majors.asp#bio)

*-- peer institution excerpted article follows --*

Schools, Colleges To Develop New Benchmarks By Karen A. Grava

Improved scholarly and research output will be a University priority during the next few years, with progress benchmarked against a new group of peer institutions.

So UConn has established a new set of peers, which it hopes to move beyond within five years. This set includes: the Universities of Minnesota, Missouri, Georgia, and Iowa, and Iowa State, Ohio State, Purdue, and Rutgers Universities.

“We believe these institutions define a standard of excellence and quality that UConn can attain and surpass by focusing its resources in areas that enhance scholarly productivity and undergraduate education,” Singha says. “We will use these universities to help us evaluate our progress, and to encourage and reward performance in areas that will be visible to the community.” He says the metrics developed by the schools and colleges will also help determine resource allocation.

Competing with the other institutions involves more than hiring faculty, however. It also will require the University to push students to graduate in four, rather than five or six, years, and to increase its annual external research expenditures – a standard measure used, for example, by the National Science Foundation – from \$107,000 per faculty member to, say, \$139,000 like Purdue, or \$184,000 like the University of Minnesota. The amount spent on external research expenditures is determined by the number and amount of grants attracted by University faculty.

Physics: 1. I tend to agree with the above that we should be influenced by the BS requirements of our peer institutions.

2. If we give courses in Biology equal standing with courses in Chemistry and Physics to satisfy requirements for the BS degree, (Math is already automatically a requirement) then Biology should offer a much better set of choices than just BIOL 107 or 108.

3. During our meeting of 5-6-05 it became apparent that the majority opinion was that either the college should leave the BS requirements up to the wisdom of each department (complete freedom), or, that a choice of two areas of expertise out of three be allowed for the students and their advisors to make. The three areas were Chemistry, Biology and Physics. Since our physics students are unlikely to choose courses in Biology, and since biology is getting more and more important today, this two out of three system would be counterproductive for physics students.

On the other hand, psychology and possibly some people in biology may feel that the physics sequences that we offer are not useful for their students.

In conclusion, if Biology offered a better choice of BS courses, and if physics would attempt to improve its teaching of the 121-2 and 3 sequence, then I would opt for the three out of three system. If we are voted down on this 3/3 option, then the complete freedom option (CF) would be my next choice. If the CF option is voted in, then representatives from psychology, chemistry, biology, physics and math. should meet once a year, to inform each other of the content of the courses being offered, so as to lead to better informed recommendations made by each department to their BS students.

**Physics:** I think it would be appropriate to review what our peer institutions are doing. I do not want to see any undocumented and anecdotal comments from a selected set of

universities, but instead a compilation of the requirement from UConn's official set of peers. The new group includes the Universities of Minnesota, Missouri, Georgia, Iowa, Iowa State, Ohio State, Purdue, and Rutgers.

**MCB:** Based on various conversations and on discussion at the Friday May 6 meeting, I believe that none of the compromise plans put forth satisfy the original intent of what has become known as the "Knecht proposal." That proposal was based upon a discussion at an MCB faculty meeting last Fall, and so reflects the feeling of the MCB faculty that a basic Biology course is essential in a liberal arts curriculum leading to a Bachelor of Science degree. I have found that several major state universities around the country agree with this principle and require one or more biology courses of all BS students enrolled in their colleges that are comparable to our CLAS. Some even require this for BA degrees. I do not believe any of the alternative proposals put forth address this deficiency in the current CLAS curriculum. Before proceeding with any alternatives, the CLAS C&C committee needs to vote to accept or reject the basic premise that all BS graduates have to have one Biology course, and that the appropriate course will be decided by the Biology faculty. After that decision is made, we can discuss how we should proceed.

I have compiled a summary of the college-level requirements from Ohio State, Illinois, Wisconsin, Georgia and Berkeley. If you would like, I can send PDF files of their websites that give the details of their requirements. Each of these universities have high quality chemistry and physics programs, and most have included some biology in their curricula.

Although I understand the desire to not add additional coursework to the chemistry and physics degrees, the argument is not compelling because clearly there are ways to include biology courses and maintain rigorous programs as other universities have done. In the interests of meeting larger educational goals, I think we all may have included "unwanted requirements" in our majors' curricula to conform to the existing BS requirements. Based on the 2004-5 data distributed at the meeting, 67.1% of the BS degrees in CLAS were awarded in the five Biology degree programs while only 9.5% and 2.9% were awarded in Chemistry and Physics, respectively. The vast majority of our BS majors are perhaps already taking unwanted requirements" to meet the current curriculum requirements.

I have compiled a list of courses that meet these requirements at three of the universities. At OSU, U of I and UGA none of the biology requirements are met by a course like our Biochemistry or Structural Biology courses. Indeed, at Georgia Chemistry majors are told that a basic biology course is the preferred course to meet college/university requirements and at Illinois biochemistry is required for Chemistry majors in addition to the general biology course required by the college.

**Chemistry:** I have looked at the Illinois requirements, and it is clear to me that some pretty detailed study is required to correlate our programs with theirs. However, it looks like their chemistry degree requires less credits than ours, in particular because we only include our chemistry classes in the major count of credits, but in addition we require various physics and math classes. However, in their 30 credits for the major, they include math and physics.

The job of reconciliation of our programs with those of (multiple) other universities is clearly not trivial, and requires a pretty good spreadsheet analysis before we can figure out why it is so difficult for Chemistry and Physics to squeeze in BIOL here at UCONN. That it is difficult is a fact. No amount of talking is going to change the facts without a major realignment of the requirements of a chemistry or physics major.

I reiterate something that we have said before, which is that it is no problem for BA, and BS Chemistry Majors to do BIOL 107/108, but it is a problem for our American Chemical Society (ACS) accredited majors to do it, because of the extra classes they need to do for accreditation. However, some of the students who do the ACS accredited degree may be able to do BIOL107 if they come in with a good high school background in chemistry and can pass out of our general chemistry classes. Also, I should point out that many of our best students actually do a double major in chemistry and biology of some sort anyway, albeit with a 5 year or more program. So I figure that there are probably very few students who are actually deficient in biology.

My overall impression is that there are probably too many detailed requirements on students, and that there are far too many students taking longer than four years to obtain their degree as a result.