PROPOSED CHANGES TO DEGREE PROGRAMS IN THE
UNDERGRADUATE CATALOG 2012-2014
or
LAW SCHOOL CATALOG 2012-2014

Type of Change
- Nonacademic Change
- Academic Change
- Degree Program Change

1. NAME OF DEGREE PROGRAM:
   B.S. BIOCHEMISTRY

2. IF THE ANSWER TO ANY OF THE FOLLOWING QUESTIONS IS YES, THE COLLEGE MUST
   CONSULT NEAL ARMSTRONG WHO WILL DETERMINE WHETHER SACS-COC APPROVAL IS
   NEEDED.
   • Is this a new degree program? Yes or no? No
   • Does the program offer courses that will be taught off campus? Yes or no? No
   • Will courses in this program be delivered electronically? Yes or no? No

3. EXPLAIN CHANGE TO DEGREE PROGRAM:
   1. Change the sentence in the introductory paragraph to reflect the changes to Option II.
   2. Prescribed work common to all options:
      a. Move the foreign language requirement to Option I, which is the only option that will have this
         requirement.
      b. Move the chemistry requirements to Options I and III. The chemistry requirements for Option II
         are modified and now reflected under that option’s requirements.
         i. Change organic chemistry course numbers per approved course inventory changes.
         ii. Remove CH 153K from the physical chemistry requirement
         iii. Add CH 353 as an option in the physical chemistry requirement.
   3. Increase the required number of upper-division hours in residence from 18 to 21.
   4. Option I: Biochemistry: Add Biology 326M, 335, 346, 361, and 365W to the cellular and developmental
      biology list of courses.
   5. Option I: Removing requirement for 9 additional hours in engineering and science.
      requirement.
   7. Option I: Allow three hours of additional chemistry coursework to come from upper-division biology
      courses listed in cellular and developmental biology requirement.
   8. Option I and II: Remove the total number of hours required from the department; the total is the sum of the
      required courses.
   9. Option II: Update the title and degree requirements of the option. It has been updated to reflect the skills
      needed for biochemists working on the computation field of systems and synthetic biology, which exists at
      the intersection of biology, chemistry, biochemistry and computer science.
   10. Option III: remove NSC 301C and replace with UGS 303.

3a. Indicate pages in the undergraduate catalog where changes will be made.
   Pages 531-533
4. **GIVE A DETAILED RATIONALE FOR CHANGE. INDIVIDUAL CHANGES SHOULD BE LISTED SEPARATELY.**

1. The sentence describing the computation option has been updated to reflect the goals of the option that is now focused on systems and synthetic biology.
2. Changing of organic sequences to upper-division. Majority of the students enrolled each semester are upper classmen. CH 153K was deemed by the biochemistry faculty as no longer necessary for biochemistry majors. Either CH 353 or 353M may fulfill the physical chemistry requirement. The faculty removed the foreign language/foreign culture requirement in Option II to make room for courses in other departments to meet interdisciplinary needs.
3. The change is intended to strengthen the overall degree. The change is in line with the Bachelor of Arts degree.
4. Expanding the list of acceptable courses for majors. b. Reducing the total of chemistry semester hours to 41 from 42 to reflect dropping of the CH 153K requirement.
5. The requirement for 9 additional hours in CNS or Engineering was a hold-over from a previous catalog that is no longer considered a required degree component by the faculty. The degree already requires a substantial number of science courses, and the faculty would like to give the students more freedom in elective hours in the degree.
6. Expand the list of courses that may be used to fulfill the additional 6 hours of chemistry lecture or lab courses to include appropriate upper division BIO courses.
7. Expanding the list of courses that may be used to fulfill the additional 6 hours of chemistry lecture or lab courses to include appropriate upper-division biology courses.
8. Some degree requirements are worded to require a minimum number of hours that consists of the total sum of the required courses. If a student selects a course when given a choice that results in the required courses being fulfilled, but brings the student up short of the total number of hours, the department files a petition to reduce the minimum hour requirement accordingly.
9. Option II has been renamed and updated to reflect the coursework and skill requirements for students who wish to pursue the computational field of systems and synthetic biology. Systems and synthetic biology is a remarkable new discipline that builds off of the enormous leaps in data about genomics, proteomics, and metabolomics that have accumulated over the past decade. Because of the need for both a more quantitative and more convergent skillset for understanding biology, the Systems and Synthetic Biology option will draw heavily upon each of the three component disciplines (Chemistry and Biochemistry, Biology, and Computer Science), but blend them in a very new way. The option adds three new courses in Systems and Synthetic Biology: SSB 339J, SSB 364C, and SB339Q. Together, these courses build an integrated, model-based, quantitative view of biological systems. The courses take the basic, reductionist knowledge garnered in Chemistry, Biochemistry, and Biology courses, and meld this knowledge in the context of systems. The prerequisite Computer Science courses have been updated to allow students in both SSB 364C and SSB 339Q to undertake quantitative modeling of systems, and to examine the emergent properties that arise from a myriad of molecular interactions.
10. NSC 301C is no longer offered as the Dean’s Scholars seminar course. The Dean’s Scholars seminar course is now being replaced by a section of UGS 303 approved by the departmental honors adviser.

5. **SCOPE OF PROPOSED CHANGE**

5a. **Does this proposal impact other colleges/schools? If yes, then how? #9 Yes**

If yes, impacted schools must be contacted and their response(s) included:

Person communicated with: Larry Abraham
Date of communication: May 31, 2011
Response: Approved
5b. Does this proposal involve changes to the core curriculum or other basic education requirements (42-hour core, signature courses, flags)? If yes, explain: No

   If yes, undergraduate studies must be informed of the proposed changes and their response included:
   Person communicated with:
   Date of communication:
   Response:

5c. Will this proposal change the number of hours required for degree completion? If yes, explain: No

6. COLLEGE/SCHOOL APPROVAL PROCESS
Department approval date: (1-5) April 20, 2011; (6) May 19, 2011; (8) June 6, 2011; (7) September 7, 2011
College approval date: (1-5) April 21, 2011; (6) May 19, 2011; (8) June 6, 2011; (7) September 8, 2011
Dean approval date: September 26, 2011

Include proposed catalog copy below. The proposed text should be based on the text of the current catalog available at http://www.utexas.edu/faculty/council/pages/catalog_chgs/catcopy.html. Strike through and replace only the specific language to be changed. For questions on completing this section, please contact Anita Ahmadi, fc@austin.utexas.edu, 471-5936 or Brenda Schumann, brenda.schumann@austin.utexas.edu, 475-7654.

BACHELOR OF SCIENCE IN BIOCHEMISTRY

The degree of Bachelor of Science in Biochemistry is intended to prepare students for professional careers as chemists, either upon graduation or after graduate study in chemistry or related fields. In addition, it may serve as the basis for work in many areas outside pure chemistry, such as materials science, medicine and other health-related fields, pharmacology, patent law, business, and environmental science. The computation systems and synthetic biology option is intended to prepare students for professional and graduate programs by providing the quantitative and interdisciplinary skillsets necessary to understand biology from the level of molecules to the level of the organism. In the workplace by giving them opportunities to develop hands-on computation skills. The honors option is intended to prepare students for academic or research careers.

Students who plan to follow option III, biochemistry honors, must be admitted to the Dean’s Scholars Honors Program as described on page 513.

PRESCRIBED WORK COMMON TO ALL OPTIONS

All students pursuing an undergraduate degree must complete the University’s core curriculum, described in chapter 2. The core includes courses in language, literature, social sciences, natural sciences, and fine arts.

In addition, students seeking the BSBioch must complete the following degree-level requirements. In some cases, courses that fulfill degree-level requirements also meet the requirements of the core.

1. Two courses with a writing flag or a substantial writing component. One of these courses must be upper-division. Courses with a writing flag or a substantial writing component are identified in the Course Schedule. They may be used simultaneously to fulfill other requirements, unless otherwise specified.

2. Options I and II: One of the following foreign language/culture choices. Students in option III are exempt from this requirement.
   a. Second-semester-level proficiency, or the equivalent, in a foreign language.
   b. First-semester-level proficiency, or the equivalent, in a foreign language and a three-semester-hour
course in the culture of the same language area.
- c. Two three-semester-hour courses in one foreign culture area. The courses must be chosen from an approved list available in the dean’s office and the college advising centers.

2. At least thirty-six semester hours of
- a. General chemistry: Chemistry 301 or 301H, 302 or 302H, and 204 or 317.
- b. Organic chemistry: Chemistry 118K, 118L, 318M, and 318N; or 210C, 310M, and 310N
- d. Physical chemistry: Chemistry 153K and 353M.
- e. Analytical chemistry: Chemistry 455.

2. At least thirty-six semester hours of upper-division coursework.

3. At least eighteen twenty-one semester hours of upper-division coursework, including at least twelve semester hours of upper-division coursework in chemistry, must be completed in residence at the University.

ADDITIONAL PRESCRIBED WORK
FOR EACH OPTION

OPTION I: BIOCHEMISTRY

4. One of the following foreign language/culture choices.
   - a. Second-semester-level proficiency, or the equivalent, in a foreign language.
   - b. First-semester-level proficiency, or the equivalent, in a foreign language and a three-semester-hour course in the culture of the same language area.
   - c. Two three-semester-hour courses in one foreign culture area. The courses must be chosen from an approved list available in the dean’s office and the college advising centers.

5. Mathematics 408C and 408D, or 408N, 408S, and 408M; and at least three semester hours of upper-division coursework in mathematics or computer science.

6. One of the following sequences: Physics 301, 101L, 316, and 116L; 303K, 103M, 303L, and 103N; 317K, 117M, 317L, and 117N.

7. The following chemistry courses:
   - a. General chemistry: Chemistry 301 or 301H, 302 or 302H, and 204 or 317.
   - b. Organic chemistry: Chemistry 118K, 118L, 318M, and 318N; or 210C, 310M, and 310N 128K, 128L, 328M, and 328N; or 220C, 320M, and 320N.
   - d. Physical chemistry: Chemistry 153K and 353 or 353M.
   - e. Analytical chemistry: Chemistry 455.

8. Either Biology 311C, 311D, and 325 or Biology 315H and 325H; and nine additional semester hours in biology, chosen from the following courses. These nine hours must include at least three hours in each of the following areas; a single course may not fulfill this requirement in more than one area. A course may not count toward both requirement 8 and requirement 9.
   - b. Physiology: Biology 328, 339, 345, 361T, 365R or 371M, 365S.

9. Nine semester hours of coursework in the College of Natural Sciences (excluding chemistry), the Cockrell School of Engineering, and the Jackson School of Geosciences. Any course designed for science or engineering majors may be counted. With the exception of the courses in the Elements of Computing Certificate program, a course may not be used to fulfill this requirement if it cannot be counted toward major requirements in the department that offers it. No more than six hours of laboratory or field research coursework in the Jackson School or any department in the College of Natural Sciences or the Cockrell School may be counted.

   - At least three of these hours must be in a laboratory course; courses marked with an asterisk fulfill this laboratory requirement. Three of these hours may come from the biology courses listed above in 8a.
course may not count toward both requirement 8 and requirement 9. No more than three semester hours in Chemistry 369K may be counted toward this requirement; three additional hours may be counted as electives. No more than three semester hours in Chemistry 371K may be counted toward this requirement; three additional hours may be counted as electives. No more than three semester hours of Chemistry 372C may be counted toward this requirement; three additional hours may be counted as electives.

11. A total of forty-two semester hours of chemistry.

12. Enough additional coursework to make a total of 127 semester hours.

**OPTION II: COMPUTATION SYSTEMS AND SYNTHETIC BIOLOGY**

Students who complete option II may simultaneously fulfill some of the requirements of the Certificate in Scientific Computation, which is described on pages 514–515.

4. The following chemistry courses:
   a. General chemistry: Chemistry 301 or 301H, 302 or 302H, and 204 or 317.
   b. Organic chemistry: Chemistry 328M and 128K.

5. Mathematics 408C and 408D, or 408N, 408S, and 408M; Statistics and Scientific Computation 321, and either Statistics and Scientific Computation 329C or Mathematics 340L or 341.

6. One of the following sequences: Physics 301, 101L, 316, and 116L; 303K, 103M, 303L, and 103N; 317K, 117M, 317L, and 117N.

7. Either: Biology 311C, 311D, and 325, or Biology 315H and 325H; and nine additional semester hours in biology, chosen from the following courses. These nine hours must include at least three hours in each of the following areas; a single course may not fulfill this requirement in more than one area.
   b. Physiology: Biology 328, 339, 345, 361T, 365R or 371M, 365S.

8. Six additional hours of upper-division Biology chosen from the following: Biology 320, 326R and 126L*, 330, 331L*, 337, 344, 347, 349 and 360K*. Courses marked with an asterisk may count toward the laboratory hours in requirement 10.

9. Six additional hours of upper-division Chemistry chosen from the following: Chemistry 128L*, and 328N, 341*, 353 or 353M, 153K*, 455*, 369L* and 369T*. Courses marked with an asterisk may count toward the laboratory hours in requirement 10.

10. Of the twelve upper-division hours used to satisfy requirement #8 and #9, at least six hours must be laboratory-based courses.


12. One of the following sequences:
   a. Computer Science 303E and nine hours chosen from: Computer Science 313E, 320N, 324E, 326E, 327E, and 329E.
   b. Computer Science 312 and nine hours chosen from: Computer Science 313K, 314, and an upper-division computer science course.

Students seeking a more rigorous foundation in computer science are encouraged to choose sequence b.

13. Six hours of Biology 377 or Chemistry 369K or another approved independent research course.


10. Statistics and Scientific Computation 222, and three of the following courses. The student must complete coursework from at least two of the following areas.
   b. Statistical methods: Biomedical Engineering 335, Mathematics 358K, 378K.

11. Three semester hours chosen from the following laboratory courses: Chemistry 431, 341, 369K, 369T, 371K, and 374K.

12. A total of forty-two semester hours of chemistry.

13. Enough additional coursework to make a total of 127 semester hours.
OPTION III: BIOCHEMISTRY HONORS

4.6. Breadth requirement: An honors mathematics course, Biology 315H and 325H, Chemistry 301H and 302H, and three additional semester hours of coursework chosen from honors courses in the college. Credit earned by examination may not be counted toward this requirement.

5. The following chemistry courses:
   a. General chemistry: Chemistry 204 or 317.
   b. Organic chemistry: Chemistry 118K, 118L, 318M, and 318N; or 210C, 310M, and 310N 128K, 128L, 328M, and 328N; or 220C, 320M, and 320N.
   d. Physical chemistry: Chemistry **153K and 353 or 353M.**
   e. Analytical chemistry: Chemistry 455.

6.7. **Natural Sciences 301C.** A section of Undergraduate Studies 302 or 303 that is approved by the departmental honors adviser.

7.8. A section of Rhetoric and Writing 309S that is restricted to Dean’s Scholars.

8.9. Chemistry 379H and either a three-semester-hour upper-division research course approved by the departmental honors adviser or a second section of Chemistry 379H.

9.10. Twenty-eight additional semester hours of coursework approved by the departmental honors adviser.

10.11. Six semester hours of coursework in the College of Liberal Arts or the College of Fine Arts.

11.12. Enough additional coursework to make a total of 120 semester hours.

SPECIAL REQUIREMENTS

Students in all options must fulfill the University-wide graduation requirements given in chapter 1 and the college requirements given earlier in this chapter. They must also earn a grade of at least C- in each mathematics and science course required for the degree, and a grade point average in these courses of at least 2.00. More information about grades and the grade point average is given in General Information.

To graduate under option III, students must remain in good standing in the Dean’s Scholars Honors Program, must earn grades of at least A- in the departmental research and thesis courses described in requirement 9 above, and must present their research in an approved public forum, such as the college’s annual Undergraduate Research Forum.

ORDER AND CHOICE OF WORK

The student must consult the undergraduate adviser each semester regarding order and choice of work.