

B.A. in Chemistry, Biochemistry Track

A Proposal for a new degree track from the
Department of Chemistry

Summary: The Department of Chemistry is committed to offering diverse degree tracks that meet the needs of students with diverse educational and post-graduate goals. Currently, we offer four tracks for the Bachelor of Science in Chemistry (Professional, General, Biochemistry, and Chemical Physics) and three tracks for the Bachelor of Arts in Chemistry (General, General with Teaching Credential, and 3-2 Chemical Engineering). We are proposing to add a new Biochemistry track under the B.A. degree. The proposed track is similar to the B.S. Biochemistry track, but has different math requirements, no required research, and one fewer upper-division lab requirement.

Background: Recently, in conversation with our department and in response to a careful consideration of statistics across the chemistry and biology curricula, the Department of Biology added a pre-requisite of MA-005 (Statistics) to BIO-102 (Physiology). BIO-102 fulfills a requirement for our B.S. Biochemistry track, which does not otherwise require MA-005. Therefore, the new pre-requisite for BIO-102 effectively adds four units to our most popular degree track. In discussing various ways of keeping our students' loads manageable, we discussed the possibility of changing the math requirement from MA-009 and MA-010 (Calculus I and II) to MA-005 and MA-009. Some in the department felt that a B.S. in Chemistry should require at least a year of calculus. Therefore, we began to consider the possibility of a B.A. track that was similar to the B.S. Biochemistry track, but would have reduced math and laboratory work, allowing some students to complete a degree in chemistry, finish in four years without May Term, and still have room to pursue other educational and post-graduate goals.

Expected Level of Interest: It is difficult to predict how many students will opt for this new track over existing options. Students coming in with significant AP credit, or who are willing to do some coursework during May Term will have no problem completing the B.S. Biochemistry requirements, including the MA-005 pre-requisite for BIO-102. In fact, over the last five years, 53 out of 108 chemistry majors have taken MA-005 or transferred in the equivalent. We graduate roughly 12 majors each year, with about 8 in the B.S. Biochemistry track. Perhaps two or three of those would prefer the B.A. track to the B.S. track. This degree track may also attract some students to our department who previously wanted to be a double major in chemistry and biology, but couldn't quite fit in all the units.

Impact on Enrolments: Because many of our B.S. Biochemistry students are already taking MA-005, we do not expect this new track to have a major impact on MA-005 enrolment. We do expect that the enrolment in MA-010 and CHM-133 may go down by two or three students each year. We also expect that we will supervise two to three fewer student-semesters of independent research (CHM-198) each year. If this track attracts double majors to our department, it may add a few students to CHM-121, CHM-135, and CHM-195. Overall, we do not expect that the addition of this track will cause major changes in enrolment of any courses.

The Proposed Track:

B.A. Chemistry, Biochemistry Track

Required Lower-Division Courses: 33-34 units

CHM 005, 006 General Chemistry I, II (4,4)

BIO 005, 006 General Biology I, II (4,4)

Two of the following three: (8)

MA 005 Statistics (4)

MA 009 Elementary Calculus I (4)

MA 010 Elementary Calculus II (4)

One of the following combinations: (9-10)

PHY 011, 013 Physics for Life Sciences I, II (4,4)

PHY 014 Physics for Life Sciences Laboratory (1)

OR

PHY 021, 023 General Physics I, II (4,4)

PHY 022, 024 General Physics Laboratory I, II (1,1)

Required Upper-Division Courses: 31-32 units

CHM 101, 102 Organic Chemistry I, II (4,4)

CHM 113 Biochemistry (4)

CHM 115 Advanced Biochemistry (4)

CHM 121 Introductory Analytical Chemistry (4)

CHM 195 Seminar (1)

One of the following two: (3)

CHM 130 Physical Chemistry I (3)

CHM 135 Introductory Physical Chemistry (3)

Two of the following three: (7-8)

CHM 131 Physical Chemistry II (3)

BIO 102 Physiology (4)

BIO 114 Genetics (4)

Comparison with existing tracks: This degree track is the same as our B.S. Biochemistry track with the following exceptions:

The MA-009/MA-010 requirement is replaced with any two of MA-005, MA-009, MA-010.

CHM-133 (Physical Chemistry Laboratory II) is not required.

CHM-198 (Chemical Research) is not required.

Although the unit count is not very different (two units less), because BIO-102 has a pre-requisite of MA-005, this track prevents this addition of four hours to the B.S. Biochemistry track, which amounts to another four-unit reduction (essentially, MA-010).

Other Implications: CHM-135 currently has a pre-requisite of MA-010. Because it is required of the proposed track, but the proposed track does not require MA-010, we will reduce that pre-requisite to MA-009. We anticipate that some additional instructional time in CHM-135 will be spent addressing integration, the main topic from MA-010 that is applied in CHM-135.