

## Rationale for modifying the Biochemistry track (Program ~~B~~<sup>C</sup>)

### B.S. Chemistry degree program

The chemistry department seeks approval for the following modifications to its Biochemistry track (Program B) B.S. degree program:

1. Addition of the proposed advanced biochemistry course (suggested numbering BIO/CHM-114) to the list of required upper-division courses.
2. Removal of the advanced analytical chemistry course (CHM-122) from the list of required upper division courses.

These changes are load and resource neutral for faculty and the college and we do not anticipate the change will significantly impact enrollment in either the biochemistry track or other advanced courses. However, the proposed change will increase the overall student credit load for the biochemistry track B.S. program by two units, to a total of 67-68 in-program units (and here we point out that the increase is only by one unit relative to our pre-2014 track requirements). Nevertheless we think this increase is vital to our ability to provide a disciplinarily coherent biochemistry track. Our rationale is as follows:

- The B.S. Biochemistry track we have inherited from our forebears currently serves as a hidden premed major and does not provide our students with a comprehensive introductory-level understanding of the discipline of biochemistry. The addition of a required course in advanced biochemistry will ensure that biochemistry track chemistry majors receive a comprehensive understanding of biochemistry that includes the major areas of metabolism and selected aspects of the biochemistry which underlies the expression and transmission of genetic information.
- Since metabolic pathways and their associated enzymes are foundational in medicinal biochemistry and a locus of much biomedical research, the proposed changes will allow us to offer a B.S. biochemistry track that both functions as a disciplinarily coherent biochemistry track and offer better medical school preparation for those of our majors who are pursuing a medical career.
- We further judge that the increase in student credit burden would not significantly impact those of our students who elect to complete this track. The track still allows students to complete both the program and medical school requirements in four years and those who wish to pursue a double major in chemistry and biology will still only need to complete ten additional units of biology courses.

In short, the chemistry department proposes this change as a way to properly ground our biochemistry track majors' understanding of the discipline of biochemistry and strengthen their preparation for medical school without negatively impacting their ability to complete the program.

## B. General Track (Program B)

### Required Lower-Division Courses: 25-26 units

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

MA 009, 010 Elementary Calculus I, II (4,4)

*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: 29 units

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

CHM 121 Introductory Analytical Chemistry (3)

CHM 122 Advanced Analytical Chemistry (2)

CHM 195 Seminar (2)

CHM 198 Research (2)

*One of the following combinations: (4)*

CHM 130 Physical Chemistry I (3)

CHM 132 Physical Chemistry Laboratory I (1)

OR

CHM 135 Introductory Physical Chemistry (3)

CHM 132 or 133 Physical Chemistry Laboratory I or II (1)

*Upper-Division CHM Electives (8)*

## C. Biochemistry Track (Program C)

### 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)

MA 009, 010 Elementary Calculus I, II (4,4)

*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)

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### Required Upper-Division Courses: 32 units

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

CHM 113 Biochemistry (4)

CHM 121 Introductory Analytical Chemistry (3) (4)

~~CHM 122 Advanced Analytical Chemistry (2)~~

CHM 195 Seminar (2) (1)

CHM 198 Research (1)

CHM 1xx Advanced Biochemistry (4)

*One of the following combinations:* (4)

CHM 130 Physical Chemistry I (3)

CHM 132 Physical Chemistry Laboratory I (1)

OR

CHM 135 Introductory Physical Chemistry (3)

CHM 132 or 133 Physical Chemistry Laboratory I or II (1)

*Two of the following three:* (8)

CHM 131 Physical Chemistry II (3) *and* CHM 133 Physical Chemistry Laboratory II (1)

BIO 102 Physiology (4)

BIO 114 Genetics (4)

Those interested in graduate school in biochemistry should choose CHM 130 and 131 and take additional courses in advanced biochemistry, molecular biology, inorganic and organic chemistry.

### D. Chemical Physics Track (Program D)

#### Required Lower-Division Courses: 39 units

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

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

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

PHY 025 Modern Physics (4)

PHY 026 Modern Physics Laboratory (1)

PHY 040 Differential Equations (4)

MA 009, 010 Elementary Calculus I, II (4,4)

MA 019 Multivariable Calculus (4)

#### Required Upper-Division Courses: 28-29 units

CHM 101 Organic Chemistry I (4)

CHM 130, 131 Physical Chemistry I, II (3,3)

CHM 132, 133 Physical Chemistry Laboratory I, II (1,1)

CHM 195 Seminar (2)

CHM 198 Chemistry Research (2)

\*CHM Electives (4)

\*PHY Electives (8 or 9)

PHY 142/143 Circuits & Electronics with lab (4,1) recommended

\*Department Chair approval required.

#### Recommended Course

MA 140 Complex Analysis (4)