

Rationale for modification of chemistry's Professional track (Program A) B.S. Degree

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

1. Addition of the introductory biochemistry course (BIO/CHM-113) to the list of required upper-division courses
2. Addition of the proposed advanced biochemistry course (suggested numbering CHM-114) to the list of possible courses under "One of the following (4-5)".

These changes are load and resource neutral for faculty and the college and we do not anticipate they will significantly impact enrollment in other advanced courses (like CHM 160). However, they will increase the overall student credit load for the professional track B.S. program by four units, to a total of 69 in-program units. Nevertheless we think proposed changes are necessary for us to maintain an adequate professional degree program. Our rationale is as follows:

- Over the past thirty years there has been an increasing awareness of the importance of biochemistry in chemistry. This is reflected in the increasing prominence of biochemical principles and techniques in modern chemistry so that a basic knowledge of biochemistry is needed by organic, inorganic, analytical, and physical chemists, all of whom could benefit from advanced training in biochemistry as well. One result of this is that in 2015 the American Chemical Society (ACS) committee on professional training recognized biochemistry as one of the five foundational areas of chemistry, required accredited programs to offer a B.S. introductory biochemistry course to its program accreditation criteria. We agree with this judgement that introductory biochemistry is needed to provide chemists with adequate disciplinary training in the 21st Century.
- Commensurate with our judgement above, we further offer that advanced study in biochemistry would provide suitable disciplinary enrichment to qualify as an advanced chemistry elective under the proposed degree program. This judgement is shared by the accreditation guidelines of the ACS committee on professional training.
- The proposed changes are integral to the department's goal for the professional track B.S. program, namely providing students with training comparable to that offered in an ACS-certified professional program.
- 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 the program in four years and other avenues for obtaining a chemistry B.S. are available to the main sort of students who will be impacted. Specifically, those who decide to pursue graduate work in chemistry late in their time at Westmont can still complete the general track B.S. program and those who wish to pursue a double major in chemistry and biology can still complete the biochemistry track which tends to better serve those students needs overall. Meanwhile those of our students who wish to go on to graduate programs in chemistry or professional work as chemists require the proposed changes to receive adequate disciplinary grounding in the field..

Most of our students participate in undergraduate research. Each student in the B.S. program is *required* to do independent research with a faculty member.

Participating in an off-campus program is encouraged of all chemistry majors. The student may choose to do so during the fall of either the junior or senior year. The student should consult his or her academic advisor so that the required courses can be scheduled ahead of that off-campus semester.

Career Choices. A degree in chemistry can lead to many interesting and challenging careers, including: biochemist, chemical engineer, industrial or clinical chemist, college instructor, dentist, dietician, high school teacher, marine scientist, pharmacologist, physician, radiologic technician, nuclear medicine technician, forensic serologist, toxicologist, technical writer, patent lawyer, industrial hygienist, and industrial management.

B.S. Degree Major Requirements: 54-69 units

A. Professional Track (Program A)

Required Lower-Division Courses: 30 units

CHM 005, 006 General Chemistry I, II (4,4)
 MA 009, 010 Elementary Calculus I, II (4,4)
 MA 019 Multivariable Calculus (4)
 PHY 021, 023 General Physics I, II (4,4)
 PHY 022, 024 Introductory Physics Laboratory I, II (1,1)

Recommended Lower-Division Courses:

BIO 005 General Biology I (4)
 CS 010 Introduction to Computer Science I (4)
 PHY 040 Differential Equations (4)
 GR 001, 002 Elementary German I, II (4,4)

Required Upper-Division Courses: ³⁹~~35~~ units

CHM 101, 102 Organic Chemistry I, II (4,4)
 CHM 104 Advanced Inorganic Chemistry (4)
 CHM 121 Introductory Analytical Chemistry (3)(4)
 CHM 122 Advanced Analytical Chemistry (2)
 CHM 130, 131 Physical Chemistry I, II (3,3)
 CHM 132, 133 Physical Chemistry Laboratory I, II (1,1)
 CHM 195 Seminar (2)(1)
 CHM 198 Chemical Research (4)

One of the following (4-5)

PHY 142/143 Circuits and Electronics/Electronics Laboratory (4,1)

CHM 150 Special Topics (4)

CHM 160 Advanced Organic Chemistry (4)
~~CHM 199 Advanced Biochemistry (4)~~

+B20/CHM-113 (4)

All graduating majors in the professional track are required to take the Graduate Record Exam in their senior year.