

## Biochemistry Major

(14 units)

1) Ten units:

- a) Chemistry 117, 220, 230, and 235.
- b) Biology 110, 111, 121, 141, or 151.
- c) Biology 247 and 289.
- d) Biology/Chemistry 260 and Biology/Chemistry 300.
  
- e) Chemistry 280 ( $\frac{1}{4}$ ), 380 ( $\frac{1}{4}$ ), and Biology 385 ( $\frac{1}{2}$  or 1), 387 ( $\frac{1}{2}$  or 1), or Chemistry 385 ( $\frac{1}{2}$ ).

2) Four supporting units:

- a) Mathematics 110
- b) Physics 101
- c) Two units from Biology 237, 248, 345, 357 or Chemistry 225, 240, 245, 250; Mathematics 115 or Physics 102, 210. (Students intending to attend graduate school are strongly encouraged to take Chemistry 240. Students intending to attend medical school are strongly encouraged to take Physics 102 and Mathematics 115.)

3) Writing/communication requirement:

Biochemistry requires skills in oral and written communication. General, technical, and laboratory report writing are skills developed in each class. Public, class, and professional speaking skills are developed through class presentations, Beloit College symposia, and presentations at scientific meetings. Beloit College biochemistry students construct their knowledge of biochemical processes through gathering, organizing, and critically analyzing information. Additionally, students learn to present their research logically and persuasively.

Several core courses within the biochemistry major can be used to satisfy a portion of the Beloit College writing requirement: Chemistry 117, Chemistry 235, Biology 248, Chemistry/Biology 300, Biology 357, and Chemistry 385.

In addition, the major offers seminars and capstone experiences that focus on writing and communication. Chemistry 280 covers specific

communication skills required by chemistry professionals, including résumé preparation, job searching and interview skills, and computer-based tools. Chemistry 380 provides multiple opportunities to present topical scientific seminars and to evaluate seminars given by peers. Biology 385 is a capstone course that explores an area of biology deeply through careful reading and analysis of the research literature and/or primary investigation and includes oral presentations, writing, and peer review and culminates in the writing of a critical review or research manuscript. Chemistry 385 is a capstone experience for chemistry and biochemistry majors that stresses group and individual guidance on methods of writing a comprehensive paper, including scope, organization, effective use of the scientific literature, writing, style, footnotes, and use of computer text editing. The purpose of the course is to provide an opportunity to develop and demonstrate the ability to organize, extract what is most important, and present a logical discussion of a body of knowledge in the field of chemistry. Biology 387 is a capstone experience in which students prepare a primary research manuscript or critical review for submission to the departmental journal, *The Beloit Biologist*, under the mentorship of a faculty member.

Computer analysis and data visualization:

Computer skills are essential for data acquisition, analysis and visualization, simulations of biomolecular processes, and molecular modeling. Computer programs and software supplement and enhance the skills for oral and written communication in biochemistry. Excel-based spreadsheets and macros are used throughout the curriculum. Students also learn to use specialized computation and visualization tools including MathCad, ChemDraw, Spartan, Gaussian, Chem 3D, Protein Data Bank molecular viewers, and Unix/PERL-based scripts for genomics database manipulation.