Learning Goals for the Brandeis Chemistry Major

Chemistry, often referred to as the “Central Science”, examines the world at the molecular level, allowing us to understand how we interact with plants, animals and humans through agriculture, biology and medicine, and with the physical world through electronics, new materials and new sources of energy. In gaining an understanding of natural phenomena at the molecular level, chemists develop methods to command these phenomena, connecting chemistry with many disciplines including physics, mathematics, earth and environmental sciences, biology, and medicine. Put concisely, the Central Science impacts our planet by protecting and preserving our health, ecology, culture and heritage.

Chemistry majors develop extensive practical experience through laboratory courses, using both macro- and microscale techniques. Honors students participate in independent research, and virtually all majors take advantage of research opportunities, a critical part of a scientific education. Well-trained BA or BS graduates may continue their education at the highest-ranking graduate and professional schools, and/or enter traditional positions in industry (pharmaceutical, biotech) or academia; some might even pursue less traditional positions in areas as diverse as project management, science journalism, and law.

Students may enroll as BA or BS majors in the Chemistry or Chemical Biology programs or may elect to complete a four-year BA-MA program. Upon successful completion of the chemistry major, graduates will be able to use their molecular-level understanding of phenomena to:

- Master a broad set of fundamental chemical knowledge in the basic areas of the curriculum (organic, inorganic, and physical chemistry), with further emphasis on selected areas of specialization (chemical biology, materials chemistry or analytical chemistry).

- explain experimental observations and data collected from course-related and independent research.

- interpret literature data and results using fundamental chemical principles.

- use fundamental chemical principles to explain the qualitative and quantitative bases for common laboratory techniques.

- select appropriate laboratory techniques and perform the qualitative and quantitative procedures necessary to accomplish research goals.

- adapt literature information and procedures to achieve specific research goals.
evaluate conclusions drawn by scholars in the field of chemistry and recognize current limitations in the field.

think critically and creatively about possible approaches to a problem and weigh the advantages and disadvantages of different approaches.

collect, interpret, and evaluate disseminated information about scientific problems and current events.

articulate scientific ideas and explain data and conclusions to the scholarly, as well as to the lay community.

In addition, graduates participating in research projects will be able to:

design and conduct laboratory and literature research aimed at addressing both broad and specific scientific questions.

pursue an original chemical research project, formulate a thesis, and present results in both written and oral form.