**Department of Chemistry**

**Learning Outcomes Assessment Plan**

**B.S. in Chemistry**

**Program Purpose**

The purpose of the undergraduate chemistry program at the University of Utah is to provide the key knowledge base and laboratory resources to prepare students for careers as professionals in the field of chemistry, for graduate study in chemistry, biological chemistry and related fields, and for professional school including medical, dental, law and business programs.

**Learning Outcomes**

* Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Majors to be certified by the American Chemical Society will have extensive laboratory work and knowledge of Biological Chemistry.
* Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.
* Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.
* Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.
* Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.
* Students will appreciate the central role of chemistry in our society and use this as a basis for ethical behavior in issues facing chemists including an understanding of safe handling of chemicals, environmental issues and key issues facing our society in energy, health and medicine.
* Students will be able to function as a member of an interdisciplinary problem solving team.
* Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems

**Learning Outcomes Assessment**

Over the course of their undergraduate career in the Department of Chemistry, students are assessed at least once a semester using the following:

(1) Fundamentals and Knowledge: Students are given the American Chemical Society National Examination in Analytical Chemistry, Biochemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry. These examinations allow us to compare our students with chemistry majors across the country.

(2) Design and Implementation of Laboratory Experiments: As part of their extensive undergraduate laboratory experiences, students design and carry out laboratory experiments in analytical, inorganic, organic and physical chemistry. As part of Chemistry 3000 and many of our advanced labs (>5000 level), students turn in extensive written reports that describe and rationalize their laboratory results. Many of these laboratories also require the oral presentation of data.

(3) Oral and Written Communication: See (2)

(4) Critical Thinking and Exploring New Areas of Science: Either by being involved in either undergraduate research or through their lower (Chem 1215, 1225, 2315, 2325, 3000) and upper division (Chem 5700, 5710, 5720, 5730, 5750) laboratory curricula students work in teams to solve chemical problems, many of which are interdisciplinary and contemporary.

(5) Appreciation for the role of Chemistry in Society: see (4). In addition, contemporary problems where chemistry plays a role and is part of the solution are included in the curricula for all classes.