

Weber State University

Executive Summary

**Department of Chemistry
College of Science**

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Executive Summary for Chemistry

The mission of the Chemistry Department is to provide chemistry majors with the chemical skills and knowledge they need to successfully pursue their chosen professional careers and other activities following graduation from Weber State University. Included with this goal is the more global application to provide a solid foundation in theoretical chemistry and experimental techniques for other majors across campus including but not limited to: Physics, Microbiology, Botany, Zoology, Geoscience, Criminalistics, Allied Health, Engineering and others. We are also committed to providing: a solid chemical background for all preprofessional students; a general liberal education in chemistry for non-science majors (gen.ed.); and service that requires chemical expertise to the University and our community.

Much of what we do in the Chemistry Department is considered service to other disciplines across campus. In general, the Chemistry Department has averaged 12.6 graduates per year over the last 5 years but our service courses are filled with 60-120 students per section with over 14,000 SCH's taught last year. Thus, the Chemistry Department provides a knowledge base for many other disciplines on campus as diverse as pre-engineering to nursing. Moreover, service provided by the Chemistry Department is often directed towards the community and rendered beyond the boundaries of WSU. Faculty members are actively involved in community science projects which promote science education at all levels. Along with the faculty members, chemistry students render significant service each year at the Utah State Science and Engineering Fair held at the Dee Events Center.

In order to better prepare our students for industry, graduate or pre-professional school and education, faculty members within the Chemistry Department have identified and itemized a list of cognitive and technical skills desired of all graduating chemistry majors. These skills are defined as student learning outcomes. We have also identified the individual courses within the curriculum which develop these skills or outcomes. The Chemistry Department has a formalized teaching assessment program and compiles data annually. The assessment of student learning outcomes usually impacts individual courses. The American Chemical Society's Committee on Professional Training has recently revised their suggested bachelor's degree curriculum. We anticipate discussion of our curriculum over the next year and a half that may lead to changes to keep us in line with the new guidelines.

Due to pressures from within and outside the University, the Chemistry Department agreed to conform to the standard 40 upper division credit hours for graduation in the fall of 2006. Two credit hours of Independent Research and Study (chem 4800) and one hour of Student Seminar (chem 4900) were added, and the Topics in Chemistry (chem 4700) requirement was increased from one to two credit hours for both option I and II bachelor's degrees.

The strength of the Chemistry Department lies in the dedication and expertise of both the faculty and staff. Presently, all tenured or tenure-track faculty members within the Chemistry Department have terminal degrees with unique talents and technical expertise. Chemistry has always placed priority in hiring and maintaining qualified and experienced faculty who complement the design, goals and mission of the program. The number of actual faculty members (12) for Fall semester 2007 meets the normal teaching loads applied at current enrollment levels. With limited funding appropriated by the Utah State Legislature, it is

recognized that the addition of new faculty is not likely in the near future. However, not replacing faculty as they retire would seriously narrow the chemistry experience that can be offered. It must be understood that several faculty members are working significant overload hours to cover the summer semester, continuing education, and online courses. The greatest concern regarding heavy teaching loads is the time commitment that detracts from the opportunity or possibility of operating a meaningful research program. With a tenure document which includes novel undergraduate research activity, publication and scholarly activity, time, space, equipment and money must be found and provided to allow faculty to meet such requirements.

At present, several of our faculty feel it is more productive and worthwhile to build overload courses than to engage in risky chemistry research on a shoestring budget that may not yield publishable results. The Chemistry faculty unanimously feel that present support mechanisms are unrealistic to meet mounting pressures to accomplish more undergraduate research. Administrators do not seem to fully recognize the unique aspects, implications and requirements involved with chemistry research. Because chemistry research is accomplished experimentally in the laboratory, and occurs on a submicroscopic scale, many aspects are inherently exacting, complicated, time consuming, and expensive. Chemistry is such a broad discipline that virtually every faculty member has different research interests. Consequently, a wide variety of laboratory spaces, instrumentation, and equipment are needed. Our faculty desire to write more grant proposals, but many obstacles impede progress. All chemistry courses above the beginning level are extremely time intensive to prepare for and teach, the average being about four hours for every hour of class time (including labs). They are most often accompanied with large exam and lab report grading assignments. Student questions during office hours can be time consuming to answer. Chemistry faculty write many recommendation letters. Most of our current faculty also have considerable family obligations apart from work. These obligations leave little time to dream about research, though most would like to be involved. A research track record is needed before external grants will be competitive. Our research track has recently been limited to a few specific areas, such as analytical, bioanalytical, computational, and heavy oil chemistry. In view of the poor condition of much of our equipment, improved internal funding and time allocation are needed to gain footholds in more branches of chemistry.

The Chemistry program is open to all WSU students interested in chemistry or other disciplines which require chemistry. There is no application procedure required nor mechanism set up to exclude anyone from chemistry. The number of declared Chemistry majors varies from year to year. Their demographics have remained relatively constant over the past five years with about one third female and two thirds male. The total number of students taking chemistry each year has remained nearly steady over the past five years from 469.3 full time equivalent students (FTE) in 2002 to 485.3 FTE students in 2007. The distribution of students taking chemistry in traditional courses has dropped slightly, in favor of online courses. We do not foresee a huge increase in chemistry majors or graduates over the next five years. We believe the number will grow, but at a very modest rate with a net increase of possibly 3 to 6 additional graduates by the year 2012. Some of the Chemistry faculty have realized that online courses represent a great opportunity to improve otherwise flat course enrollments, bring in more university tuition and lab fee dollars, educate large numbers of students (both in and out of state) and improve their

own standard of living. The major increases in SCH's will probably occur in the chemistry service courses, especially the online service courses. The convenient location for Davis County residents may shift some students away from the University of Utah and bring them to Weber State.

The University as a whole may face a budget shortfall this year due to lower than expected enrollment, which affects every program on campus. With the increasing costs involved in running a quality Chemistry program, where consumables have risen by 50% or more over the past five years, the current expense funding will not meet the Chemistry program's future needs. Increases are observed for instruments, equipment, glassware and chemicals including: purchase, shipping, storage and disposal. Chemical prices parallel oil prices. Fiscal year 2007-2008 is not complete but the operating expenses appear to be greater than the previous year based on estimated values for total expenditures. Since 2002-2003, a \$20 to \$30 lab fee has been applied to all chemistry courses numbered 1110 through 3070. It supplemented the Chemistry Department's budget by \$58,114.50 last year. Without this fee we would not have been able to continue running the majority of our laboratory programs. If legislative appropriations do not increase, the financial future of the Chemistry program will require us to shift more of the monetary burden of the program to the students taking chemistry, or course offerings may have to be reduced. The total operating budget for 2007-2008 is \$56,975 from the usual sources plus an estimated \$50,000 from student laboratory fees. This budget should allow us to continue running current courses and allow for a few small improvements and innovations. If the number of chemistry students rises, it will remain difficult to provide a meaningful and well rounded chemistry education over the next few years. The operating budget will be insufficient to accommodate more than a few undergraduate research students. While short term grants are available from Research and Professional Growth, and the Office of Undergraduate Research, they are typically about \$3,000.00, which is inadequate startup funding and will not allow purchase of major instrumentation needed to expand serious research in our department.