Assessment
in the
Chemistry Program
University of Wisconsin-Platteville

MISSION

University Mission: The fundamental mission of UW-Platteville is to serve the people of Wisconsin. This basic goal is expressed in detail in the mission statement adopted in 1988 and revised in 2002. In those statements, UW-Platteville pledges itself (in part) to:

   Enable each student to become broader in perspective, more literate, intellectually more astute, ethically more sensitive, and to participate wisely in society as a competent professional and knowledgeable citizen.

   Provide baccalaureate degree programs which meet primarily regional needs in arts and sciences, teacher education, business, and information technology.

   Expect scholarly activity, including applied research, scholarship and creative endeavor, that supports its programs at the baccalaureate degree level, its selected graduate programs, and its special mission.

   Seek to serve the needs of all students and in particular the needs of women, minority, disadvantaged and nontraditional students. Furthermore, the University seeks diversification of the student body, faculty and staff.

   Serve as an educational, cultural and economic development resource to southwestern Wisconsin.

College Vision: The College of Engineering, Mathematics, and Science as part of its 2000 Strategic Plan expressed the following vision:

   The College will be recognized as a leader in undergraduate education in engineering, mathematics, and science. The College will provide a friendly and supportive environment for learning.

   The College will provide a strong foundation for life-long learning, enabling its graduates to practice their professions with proficiency and integrity.

   The College will serve as a resource for regional economic, industrial, and community development.

Purposes of the Chemistry Program: In order to realize the mission of the University and the
Vision of the College, the Chemistry Program has the mission of providing students with information, theories, and applications relating to the properties and interactions of matter, the methods used to obtain such insight, and the abilities to critically analyze and synthesize using such information. Further, the Chemistry Program has a commitment to the preparation of majors in the field of their choice with a strong background in the chemical sciences.

As such, the Chemistry Program will maintain an intellectual environment and educational experiences which will:

- Provide students majoring in chemistry with quality preparation for success either in the professional practice of chemistry or in graduate or other professional schools.

- Provide students majoring in other areas which specifically require chemistry as part of their curriculum with a broad-based knowledge of chemistry.

- Provide students taking chemistry as part of their liberal studies with a broad-based knowledge of chemistry as well as insight into the nature of the physical sciences.

### GOALS AND OBJECTIVES

**Goals and Objectives of the Chemistry Program:** Four goals must be pursued in order for the chemistry program to achieve the above purposes. Broadly defined, these goals are excellence in: Curriculum, Faculty, Facilities, and Student Outcomes. Within each goal are specific objectives.

1. **Curriculum:** Provide an exciting, challenging, and flexible curriculum that will meet the educational needs of: a) chemistry majors and prepare them for success in careers as chemistry professionals or in graduate or professional schools and to imbue in them intellectual curiosity and a value for lifelong learning; b) students majoring in other areas that specifically require chemistry; and c) students taking chemistry as part of their liberal studies.
   1. Maintain a Chemistry Major program that meets national standards.
   2. Review the curriculum and make the appropriate changes as needed to keep it current in its content and effective in its pedagogy.
   3. Provide opportunities for student involvement in research, internships, and other types of non-classroom learning.

2. **Faculty:** Maintain a diverse and qualified faculty that is afforded the opportunity to constantly develop their pedagogical proficiency and remain current and proficient in their academic discipline.
   1. Attract and retain quality faculty.
   2. Place an emphasis on teaching and on the development of teaching skills and strategies.
   3. Place an emphasis on faculty research and support student involvement in the
3. **Facilities:** Maintain facilities and infrastructure that are state-of-the-art and create an environment that is conducive to effective teaching, learning, and research.
   1. Provide laboratory facilities that are safe and adequately equipped to support the teaching and research efforts of the program.
   2. Provide classroom facilities that meet modern standards for the delivery of instruction in the field of chemistry.
   3. Provide computing facilities in teaching and research spaces that maintain currency with advancing technology.
   4. Provide adequate access to the chemical literature and reference materials.
   5. Provide sufficient support personnel to ensure operational readiness.

4. **Students:** Meet the educational needs of our majors, evaluate their progress, gather input from them regarding our program, and clearly state our expected student outcomes. Meet the educational needs of non-majors which require chemistry, gather input from them regarding our program, gather input from faculty in their majors, and clearly state our expected student outcomes. Meet the educational needs of the liberal arts students, gather input from them regarding our program, and clearly state our expected student outcomes.
   1. A chemistry graduate will be scientifically literate and possess a broad-based knowledge of chemical principles and techniques.
   2. A chemistry graduate will be able to solve problems through creative and analytical thinking.
   3. A chemistry graduate will be an effective communicator.
   4. A chemistry graduate will be intellectually curious and value lifelong learning.
   5. A chemistry graduate will value professional ethics.
   6. A chemistry graduate will be able to work independently as well as cooperatively.
   7. Non-majors will apply their knowledge of chemistry content and laboratory practices to their major.
   8. Liberal arts students will obtain a broad-based knowledge of chemistry and will discover the patterns, principles, and dynamics of natural phenomena and relate them to issues in their lives as citizens; comprehend scientific methodology and its limitations; and engage in the analysis of natural phenomena.

**SPECIFIC OUTCOMES**

1. Is the Chemistry Major approved by the ACS?
2. Are chemistry students acquiring appropriate content, laboratory experiences, and safety training?
3. Are chemistry students acquiring adequate communication, computing, literature, interpersonal, and professional skills?
4. Are the facilities adequate for our stated purposes?
5. Is the laboratory instrumentation adequate for our several missions?
6. Are the needs of majors in other areas being met?
7. Are the needs of students taking chemistry as part of their natural science requirement being
General Program Evaluation:

1. American Chemical Society (ACS) accreditation which includes:
   1. Curriculum.
   2. Financial support.
   3. Faculty qualifications and loads.
   4. Nonacademic personnel
      1. Administrative support.
      2. Stockroom.
      3. Instrument and equipment maintenance
   5. Laboratories and classrooms that meet current safety standards.
   6. Capital equipment acquisitions.
   7. Supplies.
   8. Equipment maintenance and repair.
   9. Safety Instruction of faculty, staff, and students.
   10. Waste-handling and disposal facilities.
   11. Chemical information resources, including chemical research periodicals (print or online), reference materials, and Chemical Abstracts and other database searching facilities.
   12. Chemical computation.
   13. Student and faculty research.
   14. Faculty and student travel to professional meetings.
   15. Opportunities for scholarly growth of faculty, including sabbatical leaves.

2. Student survey of needs met in courses (not to be confused with faculty evaluation).

3. Evaluation by External Advisory Committee.


5. Facilities and Instrument survey by Facilities Committee.
**Student Outcome Assessment Tools:**

1. Use ACS standardized exams in
   1. General Chemistry 1240.
   2. Chemistry for Engineers 1450.
   3. Quantitative Analysis 2150
   5. Physical Chemistry 4130
   6. Instrumental Analysis 4240
   7. Biochemistry 4630
   8. Inorganic Chemistry 4730

2. Require a Senior Exit Exam of all majors.

3. Faculty Evaluation of Student Curriculum Vitae (CV) of all chemistry majors consisting of:

   1. **Core Academics:** Make a list of the satisfactorily completed core course requirements, electives and general education requirements which meet all requirements for the applicable degree and emphasis including a copy of transcripts.
   2. **Oral Presentations:** Three oral presentations are required which may include oral reports in classes, senior seminars, reports of practica, or research reports. List the title of the talk, the forum in which it was presented, and the approximate date.
   3. **Written Presentation:** Demonstrate ability to write in clear and coherent English in: (1) technical papers, (2) library research papers, (3) a resume, and (4) a letter of application for employment or graduate or professional school.
   4. **Instrumental Proficiency:** List laboratory instruments which you can operate and from which you can interpret the results. As a minimum it should include FTIR, NMR, UV/VIS, Atomic Spectroscopy, GC/MS, and HPLC. Include instrument manufacturers and model numbers. Include copies of your results and analyses as appropriate.
   5. **Computer Skills:** List program languages with which you have experience. List software packages with which you are familiar, including, but not limited to, word processing, data base, spread sheets, mathcad, and molecular modeling programs. List experiences in which you have interfaced laboratory instrumentation and experimental devices with computers for direct data acquisition and interpretation.
   6. **Mathematics:** List mathematics courses you have completed. Include an example of your proficiency in graphical analysis of data and linear regression techniques.
   7. **Research, Internship, or Co-op:** Provide copies of all final reports written for research activities, internship, or Co-op.
   8. **Library:** Provide a copy of a literature search that you have conducted to retrieve information from the international chemical literature or medical or
biomedical literature. List the computer and hard-copy research tools with which you have experience.

9. Cooperative Learning: List experiences which have demonstrated practical knowledge of chemistry in one or more practical projects. Experiences may occur in an industrial, governmental or academic setting, and may include tutoring, conducting tours for prospective students, summer research programs, leading a discussion group, formal lecturing, and participating in laboratory projects.

10. Group Skills: List projects you have completed working as a member of a group. Provide a copy of one report which resulted from a group activity.

11. Honors and Awards: List scholarships and departmental, university, or community honors and awards.

12. Professionalism: List your activities in the Student chapter of ACS or similar professional organization, attendance at seminars, social events, field trips, and the like which are indicative of your chemistry activities outside of the classroom.

4. Exit interviews by Program Coordinator.

5. College Survey of graduates two years after graduation.

6. College Survey of employers two years after graduation.

7. Evaluation of each Course File which consists of syllabi, sample exams, etc.

8. Survey of faculty in Biology, Animal Science, Reclamation, and Environmental Engineering.


10. Evaluation of General Education Component by the University general Education Committee.
**Student Learning Outcomes:**

1. A chemistry graduate will be scientifically literate and possess a broad-based knowledge of chemical principles and techniques.
2. A chemistry graduate will be able to solve problems through creative and analytical thinking.
3. A chemistry graduate will be an effective communicator.
4. A chemistry graduate will be intellectually curious and value lifelong learning.
5. A chemistry graduate will value professional ethics.
6. A chemistry graduate will be able to work independently as well as cooperatively.
7. Non-majors will apply their knowledge of chemistry content and laboratory practices to their major.
8. Liberal arts students will obtain a broad-based knowledge of chemistry and will discover the patterns, principles, and dynamics of natural phenomena and relate them to issues in their lives as citizens; comprehend scientific methodology and its limitations; and engage in the analysis of natural phenomena.

**Correlation of Student Learning Outcomes and Assessment Tools:**

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<th>CV Exit Inter.</th>
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<th>Employ Survey</th>
<th>Course File</th>
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