

Chemistry Program Assessment Plan: 2006-2007

Department of Natural and Physical Sciences

College of Liberal Arts and Sciences

Park University

Introduction

The Chemistry Program at Park University is firmly committed to the goals of Excellence and Internationalization set forth in the University's Strategic Plan, Explorations and Transformations 2012. The program's goal is to continue its development of high quality instructional and research programs in the chemical sciences, and in so doing make important contributions to the dynamic and rapidly progressing field of chemistry, to higher education in the Park University, and to the community at large. The Chemistry curriculum allows for exposure to the diverse fields of chemistry. The chemistry concepts rely on the basic principles of physical science and therefore course work in physics and math is included in the program requirements.

The Assessment Plan for the Chemistry Program is based on the University, College of Liberal Arts and Sciences, and Department of Natural and Physical Sciences mission and vision statements, as well as the Chemistry mission statement and program competencies. Consistent with those mission statements, the Chemistry Program will offer a liberal education to its students. It is the intent of the Chemistry Program to be of assistance in fulfilling all these mission statements by providing students with an awareness and comprehension of important cultural, economic, and environmental issues of concern to local, national, and global communities.

Foundations of the Plan

The Chemistry Program Assessment Plan at Park University is based on the following principles:

A. Flows from the institution's mission:

University Mission Statement:

The mission of Park University, an entrepreneurial institution of learning, is to provide access to academic excellence which will prepare learners to think critically, communicate effectively and engage in lifelong learning while serving a global community.

College of Liberal Arts and Sciences Mission Statement:

The College of Liberal Arts & Sciences of Park University will prepare graduates who are articulate, literate, reflective, lifelong learners and active global citizens.

Chemistry Program Mission Statement:

The mission of the chemistry program is to provide students with the knowledge and skills in laboratory and in theory in order to communicate technical information in written and verbal form. Students will be able to think critically, analytically, ethically and be problem solvers in real life situations. Chemistry students will be able to go on for further education and successfully find suitable careers.

B. Has a conceptual framework:

The conceptual framework of the Chemistry Program is demonstrated in the educational philosophy of the faculty members and the present requirements of a chemistry major as demanded by the job market and graduate schools. The program assessment is designed to evaluate a senior's knowledge of the above general areas and will be revised periodically to meet the current needs of the graduate.

C. Has faculty ownership/responsibility:

The Chemistry faculty, in collaboration with various colleagues in College of Liberal Arts and Sciences, developed the assessment plan. It has and will evolve as experience and need demands it. The most current version will always be placed on the Assessment website and Chemistry website after final approval of the University Assessment Committee.

D. Has institution-wide support:

Chemistry faculty view the assessment plan as approved only after it has received institution-wide support. That support typically consists of, but is not limited to, the Department of Natural and Physical Sciences, the Council of Chairs, the Dean for the College of Liberal Arts and Sciences, the University Assessment Committee, and the Provost.

E. Uses multiple measures:

The required Senior Capstone Project and portfolio will provide multiple measures of evaluation of the five program competencies. Other measures of assessment will provide additional measures.

F. Provides feedback to students, faculty and the larger institution:

Feedback to students through:	Feedback to faculty through:	Feedback to the university through:
<ul style="list-style-type: none">•Graded assignments and exams•Course grade	<ul style="list-style-type: none">•Course evaluations	<ul style="list-style-type: none">•Course evaluations•Annual Assessment Report

G. Does not restrict or inhabit goals of access, equity, and diversity established by the institution:

The Chemistry Program assessment plan is designed to affirm the faculty's desire to educate others about gender roles, diversity, and internationalization.

H. Leads to improvement:

The purpose of the assessment is to distinguish areas of strength and areas of improvement. Assessment tools are evaluated at least annually to permit for change and improvement. Outcomes of Major Field Tests, portfolio and Senior Capstone Projects are evaluated as they become available each year. The development of this assessment plan has already resulted in curricular changes for the program.

I. Includes a process for evaluating the assessment program:

Assessment tools are evaluated to conclude if they are providing the information required. Student and faculty feedback assists to determine the effectiveness of the Assessment Plan, as well as the overall effectiveness of the program. Modifications are made as evaluation indicates. Review of instruments is recurrent to acknowledge necessary refinement of the program.

Measures of Assessment

The Chemistry Program curriculum contains the following core classes:

CHEMISTRY		BA	BS
CH 107	Introduction to Chemistry I	3 cr.	3 cr.
CH 107L	Introduction to Chemistry I Lab	1 cr.	1 cr.
CH 108	Introduction to Chemistry II	3 cr.	3 cr.
CH 108L	Introduction to Chemistry II Lab	1 cr.	1 cr.
CH 310	Introduction to Inorganic Chemistry	4 cr.	4 cr.
CH 317	Organic Chemistry I	3 cr.	3 cr.
CH 317L	Organic Chemistry I Lab	1 cr.	1 cr.
CH 318	Organic Chemistry II	3 cr.	3 cr.
CH 318L	Organic Chemistry II Lab	1 cr.	1 cr.
CH 328	Analytical Chemistry		4 cr.
CH 405	Fundamentals of Physical Chemistry	4 cr.	
CH 407	Physical Chemistry I		4 cr.
CH 408	Physical Chemistry II		4 cr.
MATH, NATURAL SCIENCE AND PHYSICS			
MA 210	Calculus and Analytic Geometry I	3 cr.	3 cr.
MA 211	Calculus and Analytic Geometry II	3 cr.	3 cr.
NS 401	Natural Science Seminar	2 cr	2 cr
PY 205	Introduction to Physics I	5 cr.	5 cr.
PY 206	Introduction to Physics II	5 cr.	5 cr.

In addition to the program competencies, the students will also be engaged in the following chemistry program goals:

- 1) **Scientific literacy, critical and analytical thinking, ethics:**
 - a. Be able to understand scientific papers and presentations.
 - b. Be able to analyze the validity of data presented.
 - c. Be able to evaluate scientific principles and research and make ethical decisions.
- 2) **Knowledge and fundamentals of the core chemistry fields:** from the core chemistry courses:
 - a. organic chemistry
 - b. analytical chemistry
 - c. inorganic chemistry
 - d. physical chemistry

- 3) Writing skills: demonstrate good report writing – lab and/or research.
 - a. Write neat, organized and well documented lab reports.
 - b. Defend the results of an experiment in the conclusions of a lab.
 - c. Write well organized scientific papers according to the American Chemical Society’s writing guidelines.
 - d. Submit all assignments in an organized manner.
- 4) Research ability: both literature and laboratory. Be able to do literature search of a specific topic and formulate a research project. Be able to work independently in a laboratory setting.
 - a. Know where to obtain good chemistry literature.
 - b. Know the different types of literature available for research.
 - c. Learn how to use Chemical Abstracts.
 - d. Be confident with the basic laboratory equipment to work independently on a project.
 - e. Be familiar with the department’s instruments in order to obtain data independently.
 - f. Learn to work safely in a laboratory setting.
- 5) Presentation skills: present their work in a professional manner.
 - a. Organize the data and research material in a presentable manner.
 - b. Learn to use the common presentation software for presentation.
 - c. Be professional in presentation skills.

The Chemistry Program is evaluated both quantitatively and qualitatively. Each student, major and non-major, has the opportunity to evaluate each course at the conclusion of the term/semester. The results are returned to the instructor and are accessible to the program coordinator, department chair, and Dean of the College of Liberal Arts and Sciences and eventually become part of the data collection for course/program review and curricular changes.

There are numerous measures of assessment that unify each Chemistry course to the overall program outcomes and to the University Mission and Vision Statements, and the Program Mission Statement. These measures validates that the assessment of program graduates accurately exhibits their competence in the assorted standards and competencies.

Students are expected to employ best research practices, advance and implement appropriate scientific methodologies, effectively utilize primary and secondary sources, and to effectively articulate a scientific understanding based on their research.

The **course** assessment measures include, but are not limited to:

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| •Examinations | •Quizzes | •Homework Assignments |
| •Laboratory Notebooks | •Short Papers | •Major Research Paper |
| •Oral presentations | | |

The **program** assessment measures include:

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| Capstone Portfolio | Capstone Exam | Exit Survey |
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Annual Review of Assessment

Chemistry Program faculty members will review the results of the assessment annually and submit a written report of their findings and any associated program changes it intends to make as a result to the University Assessment Committee.

BACHELOR OF ARTS (B.A.) AND SCIENCE (B.S.) IN CHEMISTRY
HOME CAMPUS TRADITIONAL DAY PROGRAM

REQUIREMENTS FOR MAJOR -- 60 HOURS, 2.0 GPA

CHEMISTRY		BA	BS
CH 107	Introduction to Chemistry I	3 cr.	3 cr.
CH 107L	Introduction to Chemistry I Lab	1 cr.	1 cr.
CH 108	Introduction to Chemistry II	3 cr.	3 cr.
CH 108L	Introduction to Chemistry II Lab	1 cr.	1 cr.
CH 310	Introduction to Inorganic Chemistry	4 cr.	4 cr.
CH 317	Organic Chemistry I	3 cr.	3 cr.
CH 317L	Organic Chemistry I Lab	1 cr.	1 cr.
CH 318	Organic Chemistry II	3 cr.	3 cr.
CH 318L	Organic Chemistry II Lab	1 cr.	1 cr.
CH 328	Analytical Chemistry	4 cr.	4 cr.
CH 405	Fundamentals of Physical Chemistry	4 cr.	
CH 407	Physical Chemistry I		4 cr.
CH 408	Physical Chemistry II		4 cr.

MATH, NATURAL SCIENCE AND PHYSICS			
MA 210	Calculus and Analytic Geometry I	3 cr.	3 cr.
MA 211	Calculus and Analytic Geometry II	3 cr.	3 cr.
NS 401	Natural Science Colloquium(1cr)	2 cr	2 cr
PY 205	Introduction to Physics I	5 cr.	5 cr.
PY 206	Introduction to Physics II	5 cr.	5 cr.

SELECT FROM THE FOLLOWING ELECTIVES		7 cr.	10 cr.
CH 321	Introduction to Medicinal Chemistry	3 cr.	3 cr.
CH 329	Intro to Instrumental Analysis	4 cr.	4 cr.
CH 337	Biochemistry	3 cr.	3 cr.
CH 337L	Biochemistry Lab	1 cr.	1 cr.
CH 400	Special Topics in Chemistry	1-3cr.	1-3cr.
CH 429	Advanced Analytical Chemistry	4 cr.	4 cr.
CH 440	Organic Synthesis	5 cr.	5 cr.
CH 451	Internship in Chemistry	1-6 cr.	1-6 cr.
CH 490	Research in Chemistry	1-3 cr.	1-3 cr.
	TOTAL HOURS	49 cr.	60 cr.