

Chemistry Program Assessment

<i>Chemistry Program Assessment</i>					
<i>Program Competencies identify the knowledge, skills, and dispositions that a graduate in the major should possess. Program competencies identify measurable student behavior.</i>	<i>Course(s) in which Program Competency is covered</i>	<i>Place(s) in which Program Competency is assessed</i>	<i>Tool(s) used to assess Program Competency</i>	<i>Summary of evidence collected</i>	<i>Action(s) taken based on review of assessment evidence</i>
<i>Program Competency #1</i>					
Demonstrate an understanding of the major systems of nomenclature used in chemistry and know the basic functional groups of inorganic and organic chemistry to have a vocabulary of basic types of chemical reactions and use this to make rational chemical predictions.	CH107/108, CH317/318	Capstone Exam to be taken during the penultimate semester.	Capstone Exam		
<i>Program Competency #2</i>					
Apply the basic principles of chemistry as learned in the first-year class in a wide variety of contexts, especially the relationship of the microscopic physical nature of substance to bulk chemical behavior. Demonstrate the ability to relate scientific principles to observed properties.	CH317/318, CH328/329	Capstone Exam to be taken during the penultimate semester.	Capstone Exam		
<i>Program Competency #3</i>					
Exhibit a historical perspective of chemistry and apply the basic principles of chemistry to their environment and expand concepts globally	CH107/108, CH317/318, CH328/329,	Capstone Exam to be taken during the penultimate semester.	Capstone Exam		
<i>Program Competency #4</i>					
Write and organize a well written laboratory note book and write technical reports in a clear and logical way. Analyze and critique laboratory data for its correctness and locate probable sources of error, including a comprehension of standard statistical tests and the concepts of error and uncertainty, and a comprehension of the advantages and limitations of current instrumental and other laboratory techniques	CH107L/108L, CH317L/318L, CH328/329, CH407/408	Capstone Portfolio to be submitted during the penultimate semester.	Capstone Portfolio		

<i>Program Competency #5</i>					
Research, comprehend, apply and present needed information from the scientific literature.	CH306, NS401,	CH306 - research papers NS401 - research papers Research papers to be submitted with Capstone Portfolio.	Research papers		
<i>Program Competency #6</i>					
Present oral reports on technical material in a clear and logical way.	NS401	NS401, Oral presentations	Oral Presentations		
<i>Program Competency #7</i>					
Develop sufficient learning techniques to adapt to new educational and vocational demands, i.e., be able to self-educate in new applied areas and keep up with progress in the field as life long learners. Develop the self confidence, personal independence, and comprehension of scientific methods to competently carry out a technical project on one's own with only consultant-style assistance.	CH328/329, CH407/408	Capstone Portfolio to be submitted during the penultimate semester.	Capstone Portfolio		

The **program** assessment measures include:

Capstone Portfolio Capstone Exam Exit Survey

The capstone requirements are to be fulfilled during the penultimate semester of the student. All chemistry program faculty must be involved in capstone evaluation along with the department chair.

Capstone Portfolio: This will be used to assess lab skills of the student. Samples of graded laboratory experiments will be collected by the student in this portfolio and submitted. 20% of the lab reports from each of the following core courses are to be submitted in a proper folder to the student's advisor in the chemistry program. CH107L/CH108L/CH317L/318L, CH328/329, CH407/408. The lab reports will be assessed according to the program competencies. Research papers

Capstone Exam: This will be used to assess the core competencies learned by the student. An exam will be created by the chemistry faculty which will have questions from the following core courses: CH317/318, CH328/329, CH407/408. It will be a pass-fail test only.

Exit Survey: An exit survey will be designed by the chemistry faculty with the assistance of the chair of the department to ask student questions about their learning experience in the chemistry program at Park.

Lab Rubrics

Your lab portfolio will be graded on the following points:

- 1) writing the title, date, name, name of experiment, purpose, and any other pre-procedure tasks
- 2) writing the entire lab procedure (including any changes you might have made) in proper grammar, as indicated by the instructor,
- 3) completion of lab experiment data i.e. observation and data
- 4) completing the lab with appropriate calculations and conclusion.
- 5) make sure the spelling of technical words and compounds are correct
- 6) labs should be written in appropriate scientific terms.

UNDERGRADUATE CORE ASSESSMENT RUBRIC (CAR) 2005-2006

Course Name and Number: _____ CHEMISTRY LABS _____

NOTE: This is an enhanced version of the undergraduate CAR. Faculty members are encouraged to use this version, but they have the option of using the prior CAR. CARs that were completed in September 2005 do NOT have to be revised.

Program Competency	Exceeds Expectation (3)	Meets Expectation (2)	Does Not Meet Expectation (1)
	<i>Critical thinking and effective communication are included in the University's mission statement as well as in the literacies.</i>		
Critical Thinking	Please define the following four elements of critical thinking <u>as broadly as needed</u> to assess student learning in your course. Be as creative as possible about how critical thinking is demonstrated in your discipline. Please indicate <u>which outcome demonstrates which element of critical thinking</u>. Identifying outcomes that relate to the various elements of critical thinking shows the ways in which students demonstrate their ability. Therefore, a distinct level of student performance should be included in each box.		
Evaluation <i>outcome(s)</i>	Use more than 70% of the procedure, calculation and conclusion aspects of the lab to exhibit understanding of the lab	Uses at least 70-50% the procedure, calculation and conclusion aspects of the lab to exhibit understanding of the lab	Use less than 50% of the procedure, calculation and conclusion aspects of the lab to exhibit understanding of the lab

	experiment and techniques.	experiment and techniques.	experiment and techniques.
Synthesis <i>outcome(s)</i>	Use more than 70% of the lab techniques to set up experiments: for example: crystallization, simple distillation, qualitative analysis and any other spectroscopic or analytical technique taught in general, organic, analytical, instrumental and physical chemistry.	Use at least 70-50% of the lab techniques to set up experiments: for example: crystallization, simple distillation, qualitative analysis and any other spectroscopic or analytical technique taught in general, organic, analytical, instrumental and physical chemistry.	Use less than 50% of the lab techniques to set up experiments: for example: crystallization, simple distillation, qualitative analysis and any other spectroscopic or analytical technique taught in general, organic, analytical, instrumental and physical chemistry.
Analysis <i>outcome(s)</i>	Be able to analyze more than 70% of the results obtained in the lab according to the purpose of the lab	Be able to analyze at least 70-50% of the results obtained in the lab according to the purpose of the lab	Be able to analyze less than 50% of the results obtained in the lab according to the purpose of the lab
Application <i>outcome(s)</i>	Form more than 70% connections between the labs to apply one experimental technique in another experiment.	Form 70-50% connections between the labs to apply one experimental technique in another experiment.	Form at least 60-50% connections between the labs to apply one experimental technique in another experiment.
Effective Communication	Please define communication in terms of content and skills as appropriate for the course, and identify outcomes accordingly.		
Content of Communication <i>outcome(s)</i>	Write the chemistry lab report with more than 70% the appropriate content items.	Write at least 70-50% of the chemistry lab report with the appropriate content items.	Write less than 50% of the chemistry lab report with the appropriate content items.
Technical Skill in Communicating <i>outcome(s)</i>	Write more than 70% of the chemistry lab report using all technical terminology and techniques	Write at least 70-50% the chemistry lab report using all technical terminology and techniques	Write less than 50% of the chemistry lab report using all technical terminology and techniques

Competency	Exceeds Expectation (3)	Meets Expectation (2)	Does Not Meet Expectation (1)
Other Literacies (or Disciplinary Competency)	<p><u>If this rubric is for a GE course, please include outcomes for at least CIVIC and VALUES literacies. LL courses must include INTERDISCIPLINARY and CONTEMPORARY TOPIC outcomes. MGE and MLL courses must have a MULTICULTURAL component.</u></p> <p><u>If this rubric is for a course in a major/degree program (non-GE/LL), please identify two outcomes for discipline-specific competencies appropriate for the course (i.e. defined at the course level).</u></p>		
First Literacy (or Disciplinary Competency) 4	<p>Keep a well organized and well written laboratory notebook and write technical reports in a clear and logical way.</p> <p>And</p> <p>Good lab technique – in use of glassware, use of equipment. Show basic cleanliness and efficient use of time in lab.</p>	<p>Lab notebook is missing, or incomplete, of any one of the following: title, table of quantities, reaction, procedure, calculations or conclusions.</p> <p>And</p> <p>Fair lab technique</p>	<p>Lab notebook is missing more than one, or incomplete, writing of any one of the following: title, table of quantities, reaction, procedure, calculations or conclusions.</p> <p>And</p> <p>Does not follow instructions of good lab technique</p>
Second Literacy (or Disciplinary Competency) 4	<p>Analyze and critique more than 70% laboratory data for its correctness and locate probable sources of error, including an understanding of standard statistical tests and the concepts of error and uncertainty, and an understanding of the advantages and limitations of current instrumental and other laboratory techniques.</p>	<p>Analyze and critique 70-50% laboratory data for its correctness and locate probable sources of error, including an understanding of standard statistical tests and the concepts of error and uncertainty, and an understanding of the advantages and limitations of current instrumental and other laboratory techniques.</p>	<p>Analyze and critique less than 50% of the laboratory data for its correctness and locate probable sources of error, including an understanding of standard statistical tests and the concepts of error and uncertainty, and an understanding of the advantages and limitations of current instrumental and other laboratory techniques.</p>