WRIGHT COLLEGE
PROGRAM/DISCIPLINE ASSESSMENT FORM

Program/Discipline: Chemistry 201 **Instructional Manager:** Kevin Li

Semester/Year: Fall/2012 **Assessment Coordinator:** Kris Ochwat **Department Chair:** Doris Espiritu
Email: kochwat@ccc.edu

Plan Title: The Improvement of the Teaching/Learning Process In the Selected Areas of the Chemistry 201

Part A: Initial Plan: due to your assessment coordinator for review before the Aug 26 Assessment Committee meeting
Part B: Midsemester Update: due to your assessment coordinator for review before the Oct 21 Assessment Committee meeting
Part C: Further Updates: due date will be determined

The current submission is which of the following:
□ Initial Plan date: Aug2012

√ Mid-year update date: 10-4-12 **□ Final Report date: _____**

College Mission: Wright College is a learning–centered, multi-campus institution of higher education offering students of diverse backgrounds, talents, and abilities a quality education leading to baccalaureate transfer, career advancement, and/or personal development.
Program/Discipline Mission: The mission of the Department of Physical Sciences is to provide our students with solid foundations in Chemistry, so that articulation of classes and material content will allow for a seamless transition into their chosen fields of interest. Our charge is to encourage students to view physical phenomena critically and develop insights which will help them discover and understand the principles that govern events in nature. All are encouraged to develop their curiosity, enhance their intellectual skills, progressively mature, and recognize the growing role of science in society.

A. Initial Assessment Plan

Area of Focus:	Chemistry
Evidence:	Exit Exam results reviled the following topics as low success in the recent semester of the Chem 201: Nomenclature of ionic compounds, Identify a pure compound conceptual question, Titration stoichiometry calculation, Calculation of percent yield, Limiting reactant stoichiometry problem, Calculate number of atoms from grams of compound, Identify the oxidizing/reducing agent in a reaction, Calculate oxidation number, Acceptable quantum numbers for an electron in an orbital, Determination of formal charge on an atom in a structure, Polarity of bonds and compound from Lewis structure, Determination of hybridization of an atom in a structure.
Course(s) of Interest:	Chemistry 201

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Intended Program Student Learning Outcomes (SLOs) List each relevant SLO that this project pertains to.	B. Atoms, Molecules and Ions: 4. The distinction between ionic and molecular compounds and how to name them. C. Calculations with Chemical Formulas and Equations: 3. Interconvert between mass, moles and number of particles using molar masses and Avogadro's number. 6. Calculating amounts of reactants or products for a reaction, including a limiting reactant and a percent yield. D. Aqueous Reactions and Solution Stoichiometry: 3. Various types of reactions, such as combination, decomposition, combustion, precipitation, acid/base and oxidation/reduction. 4. Calculating the oxidation number of a species. 5. Calculating the molarity of a solution and using molarity to solve stoichiometry and dilution problems. F. Electronic Structure of Atoms 2. Quantum numbers and how they relate to the number and type of atomic orbitals, including shapes. H. Basic Concepts of Chemical Bonding 3. Calculating formal charges on atoms in Lewis structures. I. Molecular Geometry and Bonding Theories 1. Describing the arrangement or electrons and geometry of molecules and using the VSEPR theory. 2. Identifying the hybridization of atoms in molecules.
Involved Faculty: List the instructor(s) participating in the assessment process for each outcome listed above.	Maria Valentino, Sara Stellfox, Denana Miodragovich, David Fremegen, Zaishu Jin, Warren Menezes, Benito Kalaw, Krzysztof Ochwat.
Assessment/Intervention Process Address the following questions: **What** approach will be used? **Why** was this process selected? **How** will student learning be measured? **When** will data collection be completed? **Who** will analyze the results?	**What**: Communication of the problem with all involved faculty. **Why:** The effort is collective as all sections of the course follow the same curriculum and the results are analyzed for all sections together for a semester. **How**: Exit Exam **When**: at the end of the semester **Who**: Maria Valentino – the course coordinator

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B. Midyear Update – due Oct 21

Completely describe all actions that have occurred since ….

The past 8 semester data analysis for Chem 201 pre-semester Toledo exam and post-semester ACS exam had been compiled by the course coordinator – Maria Valentino. This relevant data is being analyzed in the process of making a decision about the future changes of the assessment of the course.

Analysis of Exit Exam and ACS data for Chemistry 201 for 8 semesters

Semester	Number of students	Exit Exam average (%) Pass = 43%	% passing	ACS average (%) Nat'l average = 57%	% of students above national average
Spring 2010	208	56	80.8	49	27
Summer 2010	54	68	92.6	58	54
Fall 2010	186	58	79.6	51	32
Spring 2011	199	61	87.9	53	41
Summer 2011	55	62	87.3	57	55
Fall 2011	221	53	69.7	48	29
Spring 2012	210	55	73.8	46	25
Summer 2012	76	67	94.7	55	47

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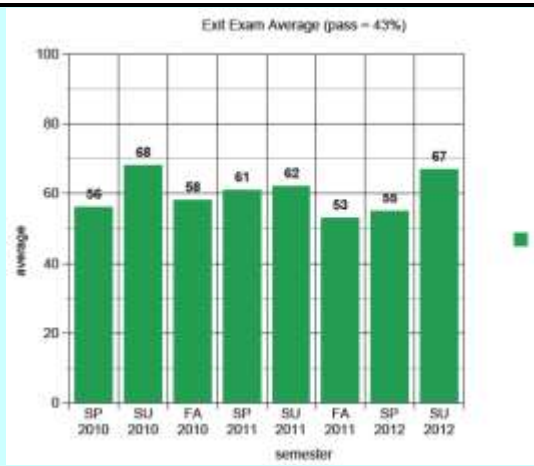
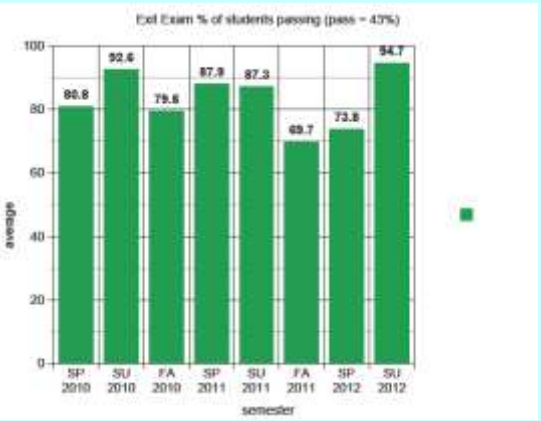
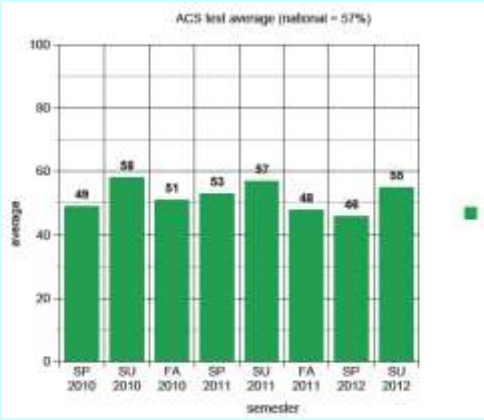
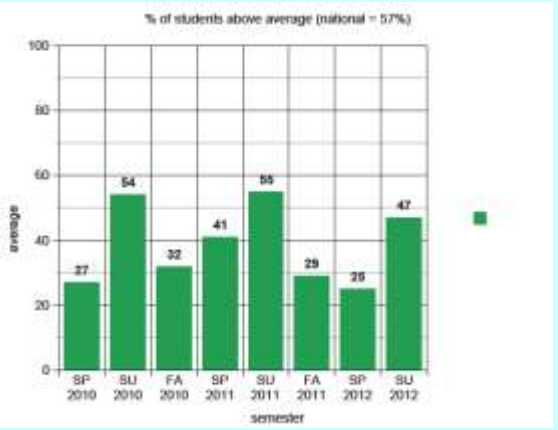


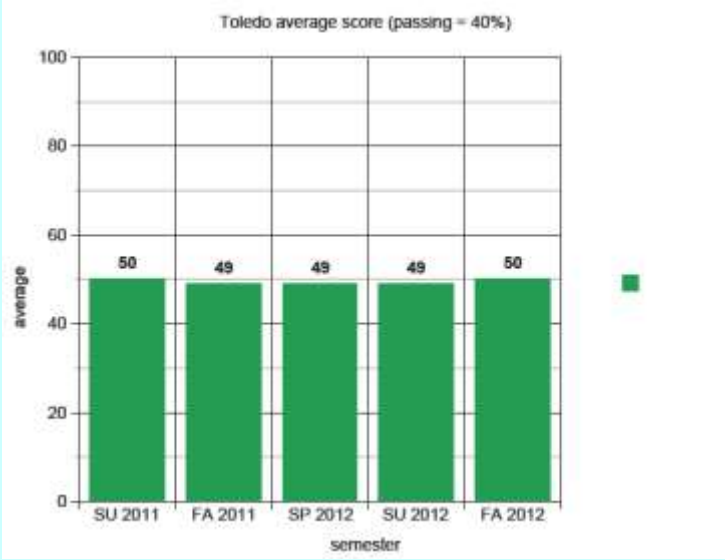






Analysis of the Toledo Exam data for Chemistry 201 for 5 semesters

Semester	Number of students	Toledo average (%) Pass = 40%	% passing
Summer 2011	65	50	89.2
Fall 2011	270	49	82.2
Spring 2012	240	49	82.1
Summer 2012	76	49	82.9
Fall 2012	259	50	79.9



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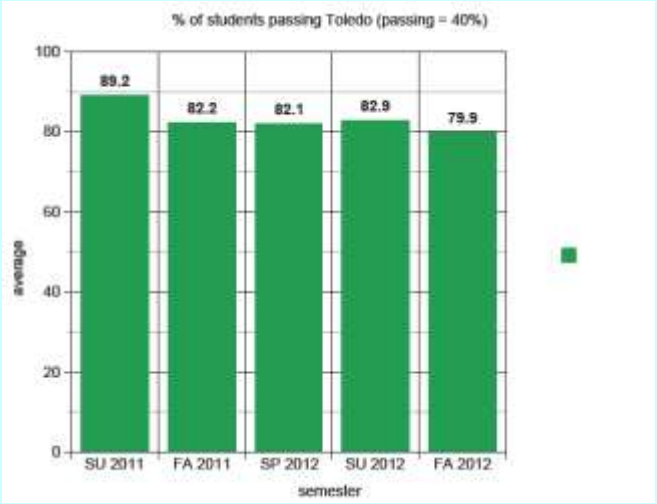

Part C – due TBD

Summary of Results and Analysis of Data Collected

What were the results of the assessment process?

What was learned from the results?

Analysis of the Toledo Exam data for Chemistry 201 for 5 semesters

questions	1 – 20 General math		21 – 40 General chemistry		41 – 60 Specific chemistry	
	% of students with > 50% wrong	% of students with > 70% wrong	% of students with > 50% wrong	% of students with > 70% wrong	% of students with > 50% wrong	% of students with > 70% wrong
Summer 2011	25	5	45	20	95	50
Fall 2011	35	5	50	25	90	40
Spring 2012	25	5	50	25	90	40
Summer 2012	30	10	45	25	95	40
Fall 2012	35	5	40	20	95	30

Toledo Exam = 60 questions in 55 minutes
Exit Exam = 70 questions in 120 minutes

Analysis of the Toledo Exam vs. Exit Exam for Chemistry 201 for 4 semesters

Semester	Number of students taking Exit	% of students who fail Toledo and fail Exit	% of students who pass Toledo and fail Exit
Summer 2011	65	4.6	4.6
Fall 2011	221	7.2	18.6
Spring 2012	210	7.1	15.7
Summer 2012	76	2.6	2.6

Questions and concerns:

1. What are we doing wrong? Why do some students pass the Toledo test but fail the Exit Exam?
2. Is the Toledo test really a good indicator of student knowledge as the prerequisites for Chemistry 201?
3. Is the Toledo test, or any prerequisite test necessary?

   Students can't move into Chem 121 because sections are full. Other sections don't fit their schedule.

   Some students who "fail" the Toledo test have already taken Chem 121.

Action Plan Based on Results and Analysis

Based on what was learned, what additional steps will be taken to improve student learning?

1. Suggestions:

   Stop doing the Toledo test. It eats up too much time in sections where the Toledo is occupying lecture time.

   Replace it with a pre-Exit exam test that covers the Chem 121 SLOs and topics of the Exit Exam. It could then be seen as a pre/post assessment. Also, it could be given during the first lab meeting for all sections.

2. Proposed Chem 201 Pre-test topics

1. # of p, n, e^- in an ion
2. balancing equation
3. gram to gram stoichiometry
4. % composition by mass
5. Limiting Reactant and % yield
6. oxidation # of atom in a compound
7. dilution problem
8. electron configuration
9. # of unpaired electrons and orbital diagram
10. Lewis structure
11. # of sigma and pi bonds in a compound
12. PV=nRT
13. Charles's Law