Curriculum Development and Implementation of
High School Chemistry
CIEP 442
Fall 2011
Loyola University Chicago

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Course Description

This course provides the basis for instructional planning for high school chemistry in any school, but will have specific emphasis on teaching in an urban setting. Four essential questions about students, their learning of chemistry, and the curriculum frame this course: How can we know what students know and can do? What is curriculum and how can it assist students learning and skill development in chemistry? How is a chemistry curriculum shaped and developed? What are the key aspects to making a chemistry curriculum work, i.e. helping students learn the essential content and skills?

Course Meeting Times & Location R 5-7:30 pm CS-415

Course Learning Outcomes

The learning experiences in this course are designed so that candidates will be able to:

1. Construct research-supported and experience-related responses that explain and support developing and implementing chemistry curriculum that is standards-based, learning-focused, collaborative, results-oriented, and data-driven. (NCATE: 2, 6, IPSL: 1B; 2B, C,D,E)
2. Identify chemistry curriculum needs and design curriculum year long plan, units and lessons that are standards-based and learning focused (NCATE: 1,2, 6, 7 IPSL: 1B, E, F; 2B,C,D,E,G,I,J; 5A,6F)
3. Describe major conceptions of chemistry curriculum and discuss implications for school-based practice. (NCATE: 2. IPSL: 1A,G; 2C, 5A)
4. Use rubrics to design and critique standards-based, learning focused curriculum and school-based curriculum implementation practices. (NCATE: 2, 6. IPSL: 2B, C, D, E)

Required Resources

(1) Bellance, J. and Brandt, R, eds (2010). *21st Century Skills: Rethinking How Students Learn.* Solution Tree.

(2) Tyler, R.W. (1949). *Basic Principles of Curriculum and Instruction.* The University of Chicago Press.

Additional Resources

(1) Herr, N. (2008). The Sourcebook for Teaching Science, Grade 6-12: Strategies, Activities, and Instructional Resources. Jossey-Bass.

(2) National Research Council (2001). *Knowing What Student Know: The Science and Design of Educational Assessment.* National Academy Press.

(3) The National Science Digital Library. *Science Literacy Maps.* http://strandmaps.nsdl.org/

Relation to the School of Education's Conceptual Framework

The School of Education at Loyola University Chicago, a Jesuit and Catholic urban university, supports the Jesuit ideal of knowledge in the service of humanity. We endeavor to advance professional education in service of social justice, engaged with Chicago, the nation, and the world. To achieve this vision, the School of Education participates in the discovery, development, demonstration, and dissemination of professional knowledge and practice within a context of ethics, service to others, and social justice. We fulfill this mission by preparing professionals to serve as teachers, administrators, psychologists, and researchers; by conducting research on issues of professional practice and social justice.

This course adopts aspects of the Loyola University Chicago School of Education's conceptual framework, *Professionalism in Service of Social Justice.* Particularly, this course helps students foster skills for that will enable them to work effectively with diverse clients (CF4).

Academic Honesty

Academic honesty is an expression of interpersonal justice, responsibility and care, applicable to Loyola University faculty, students, and staff, which demands that the pursuit of knowledge in the university community be carried out with sincerity and integrity. The School of Education's Policy on Academic Integrity can be found at: http://www.luc.edu/education/academics_policies_integrity.shtml. For additional academic policies and procedures refer to: http://www.luc.edu/education/academics_policies_main.shtml

Accessibility
Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks of the semester or term. The University policy on accommodations and participation in courses is available at: http://www.luc.edu/sswd/

Harassment (Bias Reporting)
It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. The university qualifies these incidents as incidents of bias.

In order to uphold our mission of being Chicago's Jesuit Catholic University-- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice and faith, any incident(s) of bias must be reported and appropriately addressed. Therefore, the Bias Response (BR) Team was created to assist members of the Loyola University Chicago community in bringing incidents of bias to the attention of the university. If you believe you are subject to such bias, you should notify the Bias Response Team at this link: http://webapps.luc.edu/biasreporting/

Technology
Students will use technology in a variety of ways: to access Blackboard resources and online content and skill standards, create concept maps, review and create curriculum maps. There is the additional intention to have students review and use current application on mobile devices.

Diversity
A primary focus on the activities will be on assessing all students' needs in the classroom and planning and preparing instruction with universal design and targeted differentiation.

Safety
Students must adhere to proper safety protocols and practices when conducting classroom activities and laboratory investigations. A separate agreement describing these practices must be signed before a student may participate in coursework.

Course Evaluation
Grades will be assigned in the course according to the following sources:

Criterion	Maximum Percent Value
Classroom Assignments & Reflections	10 %
Chemistry Concept Maps	10 %
Lesson Plans	20 %
Chemistry Curriculum Map	25 %
Final Program Portfolio	35 %

Classroom Assignments & Reflections will be an important part of our weekly meetings. This source of evaluation will primarily comprise various in-class analyses of readings and mini-projects related to content from readings.

Chemistry Concept Maps cover the essential topics of a high school general chemistry course and assist a teacher in articulating how concepts are connected in order to support students in their learning of the subject matter.

Lesson Plans will be assigned at four different points in the semester. These lessons are intended to integrate coursework and learnings from across the program, and ultimately, help teachers build a robust set of lessons for their own classroom use.

Chemistry Curriculum Map will be a comprehensive, year-long plan for teaching high school chemistry.

A *Final Program Portfolio* is required of all Loyola School of Education Master's Degree candidates. The specific description of this portfolio is included as a separate document. Completed portfolio must be submitted by November 25, 2011 to Live Text.

Norms of Course Proceedings
The classroom is to be a safe place to question and explore ideas. Student and teacher voices are important to this work. Collegial disagreement can be a healthy part of this process, but must always include respect for all members of the class.

Course activities will be designed to help students reach the goal of learning chemistry content and developing thinking skills. This will more often driven by the use of data and reasoning to discover concepts and solutions rather than the identification and exchange of chemical facts and algorithms.

Class sessions will begin and end on time. All students should attend class regularly and participate in class discussions. Multiple absences could affect one's ability to learn chemistry during this semester. Anticipated absences should be discussed with the instructor two class days before the absence. Proper documents may be requested to verify the reason for any absence. This is particularly relevant to days missed that include an in-class assessment for which a student is asking for a make-up.

Cell phones and the use of texting devices should be used in appropriate and professional manner. These devices should not distract other participants in the course.

Email messages among students in the course should also be respectful, appropriate, and professional. Response time to email messages is acceptable within three days.

Completed course assignments must be submitted by 5:00 pm on the due date. Late assignments may not be accepted without proper verification of reasons.

Proposed Course Schedule & Resources

Date(s)	Compelling Question(s)	Resources
Sept 01	*What is a Lesson Study? How can I participate and contribute?* *How can I know what students know and can do?*	*Knowing What Student Know:* Executive Summary (NRC)
Sept 08	*What is curriculum & instruction?*	*Basic Principles of Curriculum and Instruction* (Tyler)
Sept 15, 22	*What should high school students know and be able to do in chemistry?*	*Foreward, Introduction, & Chapter 1* (Bellanca & Brandt) *Science Literacy Maps* (NSDL)
Sept 22, 29	*How are the essential concepts and skills of chemistry connected?*	Various
Oct 06	CHEM 491	
Oct 13, 20	*How should we organize and sequence the essential understandings and skills of chemistry that students should know?*	Chapter 6 (Bellanca & Brandt)
Oct 27	*How can we frame lessons to teach the essential understandings and skills of chemistry?*	Chapters 7-10 (Bellanca & Brandt)
Nov 03	*How can we incorporate informal settings into our instruction?*	Extended Hours (MSI Chicago)
Nov 10	CHEM 491	
Nov 17	*How can we effectively integrate technology into our instruction?*	Chapters 11-13 (Bellanca & Brandt)
Dec 01	*How can the support of a Professional Learning Community enhance the intended effects of curriculum and instruction?*	Chapter 4 (Bellanca & Brandt)
Dec 08	CHEM 491	
Dec 15	*How can we use other media (i.e. news reports, movies, literature) to engage students in learning the essential concepts of skills of high school chemistry?*	Various

Cooperative Learning Groups in Chemistry

Throughout the semester, you will be asked to work together with your classmates. The instructor will assign you into groups and assign you a role to fulfill while working with that group. The purpose of these assignments is to facilitate the group's progress toward achieving certain goals. Ultimately, this tool is designed to help you as an individual learn the concepts and skills of chemistry. If, at any point, you have a question or concern about this format, please speak with your instructor.

The roles you may have throughout the semester include:

- *Manager*: The student in this role ensures that the group is functioning efficiently and progressing within the time frame set by the instructor. This student is not a supervisor, but a full participant. Additionally, this student monitors the participation of all group members to make sure all ideas have been heard.

- *Recorder*: The student in this role transcribes the agreed upon responses of the group to questions and problems. The recorder is not solely responsible for doing the work, but is responsible for accurately recording the results of the group's work. There will be times during the semester when the group's answer(s) to certain questions will be collected. The recorder submits these responses.

- *Technician*: The student in this role primarily handles calculations and the management of equipment for the group. If special operating instructions are needed for an instrument during an activity, the technician is the point person for these applications and will be trained as necessary.

- *Presenter*: The student in this role represents the group during all class discussions or during inter-group interactions. Similarly to the recorder, the presenter's responses should accurately reflect the results of the work of the group.

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1st rotation (09/01/11)

Last Name	First Name	Preferred Name	Role
Group #01			
Lyons	William	*Bill*	Manager
Passehl	Jennifer	*Jen*	Technician
			Presenter
Gana Caro	Maria	*Macarena*	Recorder
Group #02			
Reimer	Neil	*Neil*	Manager
Flanagin	Eleanor	*Eleanor*	Technician
			Presenter
Kaufmann	Laura	*Laura*	Recorder
Group #03			
Hayes	Brian	*Brian*	Manager
Plummer	Caterina	*Caterina*	Technician
			Presenter
Sayes	Reem	*Reem*	Recorder
Group #04			
Bertke	Leah	*Leah*	Manager
Gregg	Laura	*Laura*	Technician
			Presenter
Lewis	Rosette	*Rosette*	Recorder
Group #05			
Agrawal	Meeta	*Meeta*	Manager
Owens	Rachael	*Rachael*	Technician
			Presenter
Barge	Nik	*Nik*	Recorder
Group #06			
Milz	Theresa	*Theresa*	Manager
Hurt	Leslie	*Leslie*	Technician
			Presenter
Paskiewicz	Jonathan	*Jon*	Recorder