

**ROBERT S. WELCH CENTER FOR GRADUATE AND PROFESSIONAL STUDIES
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SYLLABUS

Preparing Students for Advanced Placement Chemistry

AP 512.300 (Instructor: John Hnatow)

This course is designed both for new AP Chemistry teachers and for experienced AP Chemistry teachers who have not previously participated in a summer APSI that has focused on the redesigned AP Chemistry curriculum. The course will provide information about the new course requirements. The focus of the course will be on areas essential to the teaching of the newly revised AP Chemistry course. Participants will be able to apply concrete strategies for designing and implementing an effective AP Chemistry curriculum, perform hands-on, guided inquiry-based labs, contrast the new AP Chemistry exam design with the former exam, implement strategies to effectively prepare students for the AP exam, and begin to develop or revise a syllabus to align with course requirements. Participants will be engaged in learning about the new AP Chemistry curriculum framework, the big ideas and enduring understandings, learning objectives, and the science practices. Participants will be expected to read the new AP Chemistry Curriculum Framework before the workshop begins and share a "best practice" lesson and a website resource during the week. This course ultimately is intended to inspire teachers to motivate their students to achieve at the highest possible levels. There will be one to two hours of homework daily.

Dates and times that the course meets: Monday through Thursday, 8:30 a.m. to 4:00 p.m. Friday, 8:30 a.m. to 1:00 p.m.

Note **required texts or supplemental readings:** Brown, LeMay, Bursten et al, Chemistry, AP Edition, or a comparable College Board approved textbook from the bibliography below will be included in supplied course materials. Participants should peruse the information available on the AP Chemistry Homepage on AP Central as described in the pre-Institute work.

Course objectives

- To provide the most current information regarding the structure and grading of the AP Chemistry exam.
- To provide and compare examples of multiple choice and free response questions from the "old" exam and the "new" exam.
- To provide an overview of the new AP Chemistry curriculum concepts, skills and knowledge and give teachers both theoretical background and hands-on experience to help them re-design their current courses.
- To introduce and discuss topics newly added to the course. These will include but not be limited to photoelectron spectroscopy.
- To discuss, share, and practice teaching strategies and techniques for student success. A focus will be on a learner-centered classroom.
- To become familiar with newly released AP Chemistry curriculum framework, the big ideas and enduring understandings, and the science practices.

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- To perform several of the requisite and some advanced laboratory investigations to satisfy the requirements of and enhance the AP curriculum.
- To describe and classify various levels of inquiry labs and the creation of models to guide students in meaningful inquiry.
- To become familiar with the College Board's science practices from the science curriculum frameworks
- To experience inquiry-based labs from a student perspective.
- To learn how to modify and transition from traditional "cookbook" labs into inquiry-based labs
- To demonstrate how inquiry-based activities, calculator applications, science demonstrations, Internet resources, and digital technologies can be used in an AP Chemistry course.
- To examine and use the AP science curriculum framework and AP exams as benchmarks for the new AP Audit requirements.
- To inspire teachers to motivate their students to achieve at the highest possible levels.

Please note that the AP Teacher Standards: Content Knowledge, Teacher Certification, Pedagogy, Analysis and Reflection, and Ongoing Professional Development, are addressed in the outcomes listed below:

Graduate Programs in Education Outcomes

1. GPE001: Knowledge - Theory: Apply knowledge of psychological and educational theory, research, and/or philosophy related to science specialization or certification.
2. GPE002: Knowledge - Assessments: Demonstrate understanding and use of the types of assessments appropriate to the area of science certification.
3. GPE003: Knowledge - Purpose: Identify the purpose of education in society, and be able to analyze why things happen in the educational community and/or in the political community that surrounds education.
4. GPE004: Knowledge - Diversity: Demonstrate knowledge of concepts related to diversity, and the interaction between concepts related to diversity and the area of science specialization or certification.
5. GPE005: Skills - Theory: Demonstrate the ability to incorporate theory and research into practice related to the area of science specialization or certification..
6. GPE006: Skills - Data: Demonstrate the ability to gather appropriate data and use data in problem analysis and decision-making related to the area of science specialization or certification..
7. GPE007: Skills - Problem Solving: Use problem solving/critical thinking strategies appropriate to the area of science specialization or certification..
8. GPE008: Skills - Reflection: Use reflective practice within the area of science specialization or certification..

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9. GPE009: Skills - Communication: Demonstrate effective communication and presentation skills related to the area of science specialization or certification..
10. GPE010: Skills - Technology: Use a variety of technologies appropriate for working in the area of science specialization or certification..
11. GPE011: Dispositions - Service: Demonstrate service to the community.
12. GPE012: Dispositions - Diversity: Demonstrate positive dispositions toward diversity and equity.
13. GPE013: Dispositions - Professionalism: Demonstrate professionalism in one's demeanor, behavior, conduct, decision-making, and interactions with colleagues.

Attendance policy: *If you are taking the course for credit, no absences are permitted. You must attend all five days all day to receive graduate credit.*

Instructor contact: email at apchem307@gmail.com

Detailed Breakdown of Course*

Preparing Students for Advanced Placement Chemistry AP 512.300 (Instructor: John Hnatow)

Day 1 AM

- Overview of plans for the course: content, structure, depth, and breadth
- Assignment of selected AP problems
- Brief discussion of lab safety and lab reporting methods
- Levels of Inquiry

PM

- AP laboratory programs: style, equipment, timing, reports, statistics, etc.
- Making labs effective, pre- and post-labs, design, evaluation.
- Laboratory investigation
- Use of Spreadsheets to analyze data, as applicable to AP labs

Day 2 AM

- Curricular Requirements for the syllabus
- Analysis of the AP exam. Multiple Choice and free response questions
- Using thermodynamic data to calculate the net changes in enthalpy that occurs during reactions.

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PM

- Analysis of the AP exam. Multiple Choice and free response questions
- Drawing Lewis structures and use of model building kits to construct molecules
- Graphing calculator statistical analysis
- Laboratory investigation

Day 3

AM

- Grading Standards and test construction
- Analysis of the AP exam. Multiple Choice and free response questions with
- Laboratory investigation

PM

- Transition a conventional to a Guided Inquiry Lab

Day 4

AM

- Transition a conventional to a Guided Inquiry Lab (continued)
- Analysis of the AP exam. Multiple Choice and free response questions

PM

- Laboratory investigation

Day 5

AM

- Laboratory investigation (Time permitting)
- Analysis of the AP exam. Equation writing for AP exam questions. AP style grading exercises
- The use of Interactive Web sites in Chemistry
- Evaluation and wrap up

* The topics listed, and the order of the outline, is subject to change slightly as it is highly dependent on the College Board's PD materials availability by the start of the APSI.

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BIBLIOGRAPHY

Preparing Students for Advanced Placement® Chemistry

AP 512.300 (Instructor: John Hnatow)

AP Chemistry Guided-Inquiry Experiments: Applying the Science Practices Teacher Manual (The College Board 2013)

AP Chemistry Guided-Inquiry Experiments: Applying the Science Practices Student Manual (The College Board 2013)

Jespersen, Neil, and Alison Hyslop. *Chemistry: The Molecular Nature of Matter, 7th Edition*, ©2015 New York: John Wiley & Sons.

Brown, Lemay et al., *Chemistry: The Central Science 13th Edition*, ©2015. Upper Saddle River, NJ: Pearson Education, Inc.

Burdge, Julia. *Chemistry 3rd edition*, ©2015. New York: McGraw-Hill.

Chang, Raymond, and Kenneth Goldsby. *Chemistry, AP* Edition, 11th Edition Update*, ©2014. New York: McGraw-Hill.

Hnatow, John, and Ketan Trivedi. *High School Chemistry for AP Achievement 4.0, Chemistry In a Flash*, ©2014. Blacksburg, Virginia: Paperless Publishing Corp.

Kotz, John C., Paul M. Treichel, John Townsend, and David Treichel,. *Chemistry & Chemical Reactivity. 9th Edition*, ©2015. Independence, KY: Cengage Learning.

Masterton, William L., Cecile N. Hurley, and Edward Neth. *Chemistry: Principles and Reactions. 7th Edition*, ©2012. Independence, KY: Cengage Learning.

McMurry, John and Robert C. Fay. *Chemistry. 6th Edition*, ©2012. Upper Saddle River, NJ: Pearson Education, Inc.

Moore, John W., and Conrad L. Stanitski. *Chemistry: The Molecular Science 5th edition*, ©2015. Independence, KY: Cengage Learning.

Oxtoby, David, H. Pat Gillis, and Alan Campion. *Principles of Modern Chemistry. 7th Edition*, ©2012. Independence, KY: Cengage Learning.

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Silberberg, Martin. *The Molecular Nature of Matter and Change 6th edition*. ©2012. New York: McGraw-Hill.

Smith, Cheri. *AP Chemistry 1 and AP Chemistry 2*. Edvantage info@edvantageinteractive.com
9839 5th Street Box 20001 Sidney BC V8L 5C9
Canada 1.866.422.7310

Spencer, James N., George M. Bodner, and Lyman H. Rickard. *Chemistry: Structure and Dynamics*, ©2011. New York: John Wiley & Sons.

Tro, Nivaldo, K. *Chemistry: A Molecular Approach. 3rd Edition*, ©2013. Upper Saddle River, NJ: Pearson Education, Inc.

Whitten, Kenneth, W., Raymond Davis, Larry Peck, and George G. Stanley. *Chemistry 10th edition*. ©2014. Independence, KY: Cengage Learning.

Zumdahl, Steven, and Susan Zumdahl. *Chemistry. 9th Edition*, ©2014. Independence, KY: Cengage Learning.

Description of Requirements for Graduate Credit

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Each participant will be expected to do Pre-work before attending the class, to work daily on AP Exam questions, a supplied chemistry college textbook, and an electronic Chemistry Homework website. These questions will be presented and discussed in class. Each participant will be required to 1) Present a “best practices” lesson plan 2) Annotate and present a useful chemistry web site. 3) Complete required lab activities. 4) Either, design an AP wet lab practical exam **or** an AP dry lab using sample data for analysis and interpretation **or** develop an AP-level guided inquiry experiment for presentation to the class. 5) Complete a syllabus for the Audit requirement. Somewhat subjectively, the quality of each participant’s participation will be evaluated.

Due date for final project(s): received by instructor by July 21, 2017, which will be sent in electronic format to J. Hnatow at apchem307@gmail.com

Grading and Transcript Information

Goucher College does not issue grade reports. You can obtain your grade approximately 3 weeks after concluding the course by going to the *myGoucher* website (myGoucher) and following the prompts to receive your grade. If you have misplaced your password, please contact the help desk (helpdesk@goucher.edu) and they will help you.

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If you need a paper copy of grades for tuition reimbursement, you will need to request a transcript in writing. You can fax your request to Student Administrative Services (SAS) at 410-337-6504 or mail to SAS at:

Goucher College, SAS
1021 Dulaney Valley Road
Baltimore, MD 21204

There is no charge for this request. Please allow 3-5 working days to process. To access the transcript request form, please go to <http://www.goucher.edu/x1891.xml>

Questions? Please call Shelley Johnson or Barbara Bisset at 410-337-6200.

Pre-institute assignments

Preparing Students for Advanced Placement Chemistry

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- Peruse and become familiar with the links on the AP Chemistry Homepage at http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/2119.html
Look for the following documents: the newest version of the AP Chemistry Curriculum Framework, the Webcast on PES, AP Chemistry: An Overview of Course Revisions, FAQs, Course Planning and Pacing Guides, Higher Ed Validation, Inquiry Instruction, Open Forum, Audit Information, America's Lab Report, the teacher's edition of the New AP Chemistry Lab Manual, and generally anything that is notated as being **NEW**.
- Prior to this workshop Read/Review any/all of the following topics from a college-level textbook if necessary: thermodynamics, electrochemistry, acid-base equilibria with emphasis on weak acids and bases, buffers, hydrolysis reactions, titration curves, molecular structure.
- Prepare a "best practices" sample lesson to share. This can be a lab, an assignment, an activity, an approach to a topic, etc. Be prepared to give a five-minute presentation of this "best practices" lesson that works well for you. Please note that it does not have to be at the AP level. Please bring this lesson on a jump drive to share with other participants (if it is more convenient for you, bring 25-30 hard-copies to the APSI).
- Email a chemistry related web site to John (apchem307@gmail.com) that you have found to be useful in your classroom. Include a short annotation or description of the value of using the site in a chemistry class. This site will be shared and presented to the class.
- Request via email and fill out and return a participant survey (apchem307@gmail.com) at your earliest convenience.

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Participants are asked to bring the following

- A laptop computer
- A jump drive with files of your favorite classroom activity or experiment to share with other participants
- A Texas Instruments TI83 or TI84 Graphing Calculator
- Safety Glasses or goggles
- Please bring sneakers or closed toe shoes to wear in the laboratory (Labs start on Monday.)
- Please bring your school's calendar for the 2016-17 academic year.
- Although you will receive at least one textbook when you arrive, you might want to bring a College-Level Chemistry book. Be prepared to solve and present AP test questions and textbook problems, perform experiments that correlate with and help teach content, and use a Vernier LabQuest™, and we will discuss many ways to be successful teaching AP chemistry!