

<b>COURSE NUMBER:</b> VC209	<b>COURSE TITLE:</b> Chemistry
<b>CREDIT:</b> 4	<b>PREREQUISITES:</b> High school Chemistry, 3 years high school Math.
<b>TEXTBOOKS/REQUIRED MATERIAL:</b> Chemistry-The Central Science (Theodore L. Brown; H. Eugene LeMay, Jr.; Bruce E. Bursten, et al.), Pearson International edition (Pearson Prentice-Hall, Inc.), 13 <sup>th</sup> Global Edition 2016 ISBN 13: 9781292057712, Electronic Copy ISBN: 9781292067254 ( <a href="http://www.pearson.com.au/products/?seo=&amp;&amp;sq=9781292057712">http://www.pearson.com.au/products/?seo=&amp;&amp;sq=9781292057712</a> ).	<b>INSTRUCTOR:</b> Prof. Thomas Hamade <b>DATE OF PREPARATION:</b> September 27, 2017 <b>DATE OF UC APPROVAL:</b> August 2017
<b>INSTRUCTOR(S):</b> VC209 T. Hamade 2017 (VC210: 2016 T. Hamade, 2012 Ping Liu + Ren Qizhi, Rachel Wang (2007, 2009, 2010)+ Sun Huai (2006) +Zhan Chen (2008))	<b>SCIENCE/DESIGN:</b> <b>VC209 equivalent to VC210 but mostly for enrollment of international students</b>
<b>CATALOG DESCRIPTION:</b> This General Chemistry VC209 course is intended to satisfy the one-term chemistry requirement for students interested in science, or as a natural science elective for non-science concentrators. This course may also be used as the first term in a four or more term chemistry sequence for science concentrators and pre-professional students. This course is designed to teach chemical principles to science and engineering majors. Along with VC211, this course fulfills the general education requirement for natural sciences. Chemistry VC209 content provides an introduction to the major concepts of chemistry, including the microscopic picture of atomic and molecular structure, molecular geometry & bonding theories (Lewis, VSEPR, MO), periodic trends in the chemical reactivity, the energetics of chemical reactions, reaction kinetics & thermodynamics, property of gases & liquids, phase diagrams, and the nature of chemical equilibria, and electrochemistry. Students will be introduced to the fundamental principles of modern chemistry, the descriptive chemistry of the elements, and to the underlying theories that account for observed macroscopic behavior. The students will learn to think critically, examine experimental data, and form generalizations about data as chemists and engineers do.	<b>COURSE TOPICS:</b> 1. Electronic structure of atoms; chemical bonds in molecules; molecular geometry and bonding theories; intermolecular forces and structure of matters (chap. 6, 8, 9, 11) (16 hrs) 2. Modern materials and solids (chap.11(11.6), chap. 12, chap.22(22.9, 22.10), chap 23(23.5,23.6); team work reports and oral presentations (8 hrs) 3. Properties of solutions, equilibrium of solutions, acid-base equilibrium, solubility equilibrium and buffered solutions. (chap.13,15,16,17) (10 hrs) 4. Thermochemistry, chemical thermodynamics and electrochemistry (chap 5, 19, 20) (12 hrs) 5. Equilibria & Chemical Kinetics: Chap. 14, 15-17) (4hrs) 6. Intro to chemistry, units, statistics, stoichiometry, chemical reactions, dissociation of ionic and molecular substances in solutions, concentrations, and titration: chap. 1-5 (6 hrs)
<b>COURSE STRUCTURE/SCHEDULE:</b> Lecture: twice per week + 1 lecture every odd week of the term, 90 minutes each; recitation class: 1 per week, 1 hrs	
<b>COURSE OBJECTIVES</b> [Course Outcomes in brackets]	<ol style="list-style-type: none"> <li>1. Provide the basic theories, concepts and knowledge to analyze the chemical phenomena involving in everyday life nowadays. [1, 2, 3, 4, 5]</li> <li>2. Provide appropriate exercises and training to develop an ability to analyze chemical phenomena from the view of atoms and molecules. [1, 2, 3, 4, 5]</li> <li>3. Provide a broad view to trace the current academic research and development of chemistry and to understand the impact of chemistry in global economic, energy sources, environment, and social life. [1, 2, 3, 4, 5]</li> <li>4. Provide the opportunities to cooperate with teammates, to plan, design, and research and finish a project with a common goal in a team. [2, 3, 4, 5, 6, 7]</li> <li>5. Provide the knowledge and skills to write a report in the form of ppt in a clear, readable, informative format. [2, 3, 4, 5]</li> <li>6. Provide an opportunity to practice how to report what you have learnt in public, to try how to share information and communicate ideas, progress, and results in an easily-understanding and professional manner. [2, 3, 4, 5, 6, 7]</li> <li>7. Recognize the need of self-learning and to develop the ability to engage in life-long learning. [1, 2, 3, 4, 5, 6, 7]</li> <li>8. Prepare students for advanced course related to chemistry and for their further education. [1, 2, 3, 4, 5, 6, 7]</li> </ol>

<p><b>COURSE OUTCOMES</b> [Program Outcomes in brackets]</p>	<p>After finish the course Vc210, students should be able to have:</p> <ol style="list-style-type: none"> <li>1. Knowledge of the basic concepts and theories of general chemistry and an ability to apply chemistry in one's work and life. (a, d, f)</li> <li>2. The broad education necessary to realize how the current research leads to new applications of chemistry in other fields of science and technology. An appropriate understanding the impact of chemistry in a global economic, environment and social life. (a, d, f)</li> <li>3. The broad education necessary to understand the relationship between chemistry and modern materials which must be involved in their future work. A necessary reservation of knowledge to serve their future professional interests and career. (h, i, j)</li> <li>4. An ability to create an appropriate proposal for a team work project and to search background knowledge from textbooks, reference articles and the rich Internet resources available and understand them through self-learning and group discussions. [c, d, i]</li> <li>5. An ability to construct a writing report in a ppt form to present the knowledge in a clear, readable, succinct, and informative format by using a variety of scientific methods, which is suitable for peers, advisors and other representatives who might out of your range. [g, i]</li> <li>6. An ability to present a report in an oral form by using clear, informative, understandable language, gestures and other public speak skills. [g]</li> <li>7. An ability to communicate effectively and work professionally in a team which is formed randomly.[d, g]</li> </ol>
<p><b>ASSESSMENT TOOLS</b> [Course Outcomes in brackets]</p>	<ol style="list-style-type: none"> <li>a. Online Homework and rich information in MasteringChemistry system [1,2, 3]</li> <li>b. Midterm Exam [ 1, 2, 3]</li> <li>c. Final Exam [1, 2, 3]</li> <li>d. Written ppt reports [4, 5, 6, 7]</li> <li>e. Oral presentation [4, 5, 6, 7]</li> </ol>