**j0238549Valencia College (Osceola Campus) – Summer 2016**

**SYLLABUS**

1. **Course Title**: General Chemistry with Qualitative Analysis–I

**Course Alpha-Numeric**: CHM1045C – 30891

**Contact Hour Breakdown**: 4 credit hours, 3 hour class, 3 hour lab

1. **Course Outline** can be found online via Atlas.
2. **Lecture** 
   1. **Day & Time**: Tuesday & Thursday, 8:30 am – 11:45 am
   2. **Building/Room Number**: Osceola campus, building 4, room 312
3. **Laboratory**
   1. **Day & Time**: Monday & Wednesday, 8:30 am – 11:45 am
   2. **Building/Room Number**: Osceola campus, building 4, room 414
4. **Instructor**
   1. **Name**: Dr. Timothy Barnett, MA, PharmD
   2. **Office Building/Room**: Osceola campus, building 4, room 318
   3. **Phone**: 407-582-4974 or 407-299-5000, Ext 4974
   4. **Email**: [tbarnett10@valenciacollege.edu](mailto:tbarnett10@valenciacollege.edu)
5. **Office Hours**: Office hours are posted on the office door(s), on the website, and are listed below. Questions and concerns can also be addressed via email (listed above). In addition, tutoring assistance is available.

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| **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** |
| OC: 8:00 am – 8:30 am  OC: 11:45 am – 1:45 pm | OC: 8:00 am – 8:30 am  OC: 11:45 am – 1:45 pm | OC: 8:00 am – 8:30 am  OC: 11:45 am – 1:45 pm | OC: 8:00 am – 8:30 am  OC: 11:45 am – 12:45 pm | Online:  8:00 am – 9:00 am |

1. **Required Texts and Materials**:
   1. “General Chemistry”, Ebbing & Gammon, 10th Edition, 2013.
   2. TI30x series scientific calculator or equivalent scientific calculator.
   3. A bound composition notebook.
2. **Optional Texts and Materials**:
   1. “General Chemistry Solutions Manual/Study Guide,” Ebbing & Gammon, 10th Edition, 2013.
   2. “Chemistry: A Molecular Approach”, Tro, 3rd Edition, 2014.
3. **Supplemental Materials**: All course materials will be available via Blackboard.
4. **Course Prerequisites**: CHM 1025C or one year of high school chemistry with a minimum grade of C; and MAC 1105 or honor's high school algebra II with a minimum grade of C.
5. **Catalog Description**: A study of the basic principles of chemistry including chemical reactivity, atomic structure, chemical bonding, molecular geometry, periodicity, stoichiometry, and kinetic-molecular treatment of gases. Laboratory illustrates principles discussed in classroom.
6. **Competencies Addressed**: Valencia faculty have defined four interrelated competencies (Value, Think, Communicate, and Act) that prepare students to succeed in the world community. These competencies are outlined in the College Catalog. In this course, through classroom discussion, group work, projects, labs, and other learning activities, you will further develop your mastery of these core competencies.

Specifically, during exams, quizzes, and laboratory assignments, you will be asked to communicate your knowledge of the information in a coherent manner with the use of relevant information to support your answer/opinion/analysis/claim. Your thinking skills will be developed in all aspects of this course; specifically, critical thinking skills will be necessary in order to internalize chemical concepts and problem-solving skills, as well as communicate answers effectively. Value competencies will be addressed in terms of valuing the usefulness of the scientific method in real-life scenarios, as well as understanding basic scientific information in order to be able to understand the relevance of current scientific discoveries in relation to your life. Finally, the act competency skills will be developed throughout the development and execution of a project or laboratory exercise using concepts and skills developed in the classroom.

1. **General Education Outcomes**: The general education program at Valencia is an integral part of the A.A. Degree program and is designed to contribute to the student’s educational growth by providing a basic liberal arts education. A student who completes the general education program should have achieved the following outcomes:
   1. **Cultural and Historical Understanding:** Demonstrate understanding of the diverse traditions of the world, and an individual’s place in it.
   2. **Quantitative and Scientific Reasoning:** Use processes, procedures, data, or evidence to solve problems and make effective decisions.
   3. **Communication Skills:** Engage in effective interpersonal, oral, and written communication.
   4. **Ethical Responsibility:** Demonstrate awareness of personal responsibility in one's civic, social, and academic life.
   5. **Information Literacy:** Locate, evaluate, and effectively use information from diverse sources.
   6. **Critical Thinking:** Effectively analyze, evaluate, synthesize, and apply information and ideas from diverse sources and disciplines.

Through classroom discussion, group work, projects, labs, and other learning activities, you will develop skills to attain competency in these outcomes. See the competencies addressed above for communication skills and critical thinking skills development. In addition, we will be exploring ethical responsibility during class analyses, address quantitative and scientific reasoning in labs and/or during project development and implementation and address information literacy during projects and/or labs.

1. **Major Learning Outcomes with Evidence**: At completion of course, students should be able to demonstrate a knowledge of general chemistry and be able to:
   1. **Understand the nature of units of measurement and apply proper significant figures rules.**
      1. Relate units to measurements and convert among metric and International System (SI) units of measurement, standard notation and scientific notation.
      2. Employ proper rounding rules and rules of significant figures in calculations.
      3. Employ dimensional analysis (factor-label method) for unit conversions.
      4. Differentiate between accuracy and precision.
   2. **Understand the nature of matter and its underlying physical and chemical characteristics.**
      1. Classify matter based on composition profile.
      2. Distinguish and differentiate between physical and chemical properties, and physical and chemical changes.
      3. Hypothesize ways to separate components in a mixture.
   3. **Understand design of current periodic table and apply order and trends with relation to observed properties of elements.**
      1. Classify an element as metal, nonmetal or metalloid.
      2. Distinguish between representative or main-group elements, transition elements and inner transition elements.
      3. Identify family names of specific groups.
      4. Understand groups and periods order and apply to predict trends: atomic and ionic radii, ionization energy, electron affinity and expected charge on selected elements.
   4. **Understand and apply the principles of atomic structure theory with relation to observed chemical and physical properties.**
      1. Predict chemical and physical properties of an element based on its position in the periodic table.
      2. Compare and contrast different atomic theories/models.
      3. Demonstrate an understanding of an atom’s electronic configuration relative to the element’s position in the periodic table.
      4. Understand the concept of isotopes and apply it to calculate weighted average atomic mass of an element.
      5. Given nuclide symbol, be able to determine number of protons, electrons, neutrons, atomic number and atomic mass.
   5. **Understand the nature and characteristics of a chemical bond.**
      1. Identify, compare and contrast ionic and covalent bonding in a given compound/molecule.
      2. Predict the nature of a covalent bond based on the effects of electronegativity.
      3. Draw possible Lewis structures, calculate formal charges and predict the most likely structure for a given molecular formula.
      4. Recognize and draw resonance structures.
      5. Determine bond order, bond length and bond energy relative to the bonding type.
   6. **Understand and apply the rules of nomenclature and underlying chemical quantities related to chemical compounds.**
      1. Utilize an understanding of the electronic nature of the atom’s position on the periodic table to identify ionic and covalent compounds.
      2. Classify ionic and covalent compounds including hydrates, acids and bases by type and apply appropriate rules of nomenclature.
      3. Write chemical formulas for compound names and names for formulas.
      4. Assess chemical quantities related to compounds (mass, molar mass, moles, molecules/formula units, and percent composition).
      5. Evaluate and apply the concept of solution concentration.
   7. **Understand the factors influencing chemical reactivity and quantitative relationships among species involved in a reaction.**
      1. Predict the products of a chemical reaction including precipitation, acid/base and redox.
      2. Balance chemical equations for precipitation, acid/base and redox reactions using half-reaction method.
      3. Identify and classify types of chemical reactions.
      4. Identify oxidation numbers on substances.
      5. Determine the empirical and molecular formulas of chemical compounds given quantitative data.
      6. Understand mole relationships among reactants and products in a reaction given a balanced chemical equation.
      7. Predict amount of a compound involved in a reaction given other quantitative information.
   8. **Understand and apply the relationships of physical behavior of gases.**
      1. Describe the cause of gas pressure and units of pressure.
      2. Describe the relationships among factors such as pressure, volume, temperature and quantity as stated in gas laws.
      3. Describe and identify properties of gases and gas mixtures.
      4. Utilize proper units and/or unit conversions to solve ideal gas calculations.
      5. Understand the difference between ideal and real gases.
   9. **Understand the relationship between temperature, energy and heat with respect to thermal changes in physical and chemical processes.**
      1. Relate internal energy to enthalpy of substances and their exchange between the system and surroundings.
      2. Integrate calorimetric data with heat of reaction.
      3. Relate the standard heat of formation to chemical reactions.
      4. Write a thermochemical equation for a chemical or physical process and use stoichiometry to relate the quantity of substance to the amount of heat exchanged.
      5. Compare and contrast the specific heat, heat capacity and molar heat capacity of sample and relate them to temperature change.
      6. Calculate the heat of reaction using Hess’ Law or standard enthalpy of formation.
   10. **Understand the relevance of quantum mechanics theory to the fundamental nature of light and spectroscopic data.**
       1. Relate wavelength and frequency of electromagnetic radiation to its speed.
       2. Calculate the energy of a photon.
       3. Compare the energies of the electron to the different energy levels of the hydrogen atom.
       4. Understand and determine if a set of four quantum numbers is permissible.
   11. **Understand the nature of molecular geometry as it relates to physical and chemical properties of molecules.**
       1. Apply the VSEPR model to predict molecular geometry.
       2. Relate the VSEPR formula to the level of hybridization of an atom in a molecule.
       3. Relate molecular symmetry to its dipole moment and predict polarity of a molecule based on geometry and overall dipole moment.
   12. **Enhance student’s understanding of the application of the scientific method to solve complex problems.**
       1. Recognize the components of the scientific method within a published experiment.
       2. Apply needed components of the scientific method to perform lab experiment/activities.
   13. **Employ conceptual learning outcomes and perform essential lab techniques in laboratory setting.**
       1. Prepare and complete labs to apply practical chemical concepts.
       2. Employ chemical concepts to new situations during inquiry labs.
       3. Master essential laboratory techniques critical in the application of laboratory science study.
2. **Topic Covered**:
   1. **Unit 1:** Chemistry and Measurement
   2. **Unit 2:** Atoms, Molecules, and Ions
   3. **Unit 3:** Calculations with Chemical Formulas and Equations
   4. **Unit 4:** Chemical Reactions
   5. **Unit 5:** The Gaseous State
   6. **Unit 6:** Thermochemistry
   7. **Unit 7:** Quantum Theory of the Atom
   8. **Unit 8:** Electron Configurations and Periodicity
   9. **Unit 9:** Ionic and Covalent Bonding
   10. **Unit 10:** Molecular Geometry and Chemical Bonding Theory
   11. **Unit 11:** States of Matter; Liquids and Solids (time permitting)
3. **Major Topics/Concepts/Skills/Issues**:
   1. Acquire core vocabulary, concepts, and problem-solving processes (concept ramifications) pertaining to the history and application of chemical theories.
   2. Develop ability to communicate basic chemical concepts and problem-solving processes effectively.
      1. All written materials must be in proper English and include accurate spelling, grammar, and punctuation.
   3. Develop appreciation of the scientific method as an effective problem-solving approach.
   4. Apply scientific method principles to solve real-world problems.
4. **Testing/Means of Evaluation**:
   1. The last day to withdraw from the class is: Friday, June 10th, 2016.
   2. The final grade will be calculated by the weighted total of all homework, quizzes, laboratory assignments, and examinations and/or projects.
      1. Weighted grade breakdown:
         1. Laboratory: 25%
         2. Examinations and/or Projects: 40%
         3. Homework: 7.5%
         4. Quizzes: 7.5%
         5. Cumulative Final Examination: 20%
   3. Unannounced quizzes will be given in either an individual or group setting to reinforce knowledge.
      1. In general, at least one quiz over every chapter can be expected.
   4. There will be a total of four examinations and one cumulative final examination.
      1. Cumulative Final Exam: Monday, June 20th, 2016 from 8:30 am – 11:00 am
   5. NO MAKE-UP QUIZZES, EXAMINATIONS, PROJECTS, OR LABS WILL BE GIVEN. Therefore your attendance is mandatory.
   6. The grading scale is as follows:
      1. ≥90.0%: A
      2. 80.0 – 89.9%: B
      3. 70.0 – 79.9%: C
      4. 60.0 – 69.9%: D
      5. <60.0%: F
5. **Attendance Requirements**:
   1. Attendance will be taken each day at the beginning of class and each lab. Poor attendance will affect your final grade. Only properly documented excuses will be considered, and all missed material must be made up on the student’s own time.
   2. If a student has more than two absences occurring before the withdrawal date, the student may be withdrawn from the class by the instructor receiving a grade of W.
6. **Academic Support Services**:
   1. Students who require additional services must ensure the instructor receives proper documentation from the Office for Students with Disabilities. Accommodations will not be made until the instructor has the required documentation.
   2. Exams must be completed during or prior to the classroom exam time.
7. **Classroom Rules**:
   1. Programmable calculators and cell phones are not allowed on any quizzes, exams or in class. Only scientific calculators (i.e. TI30x series) can be used.
      1. Sharing calculators during exams and quizzes is prohibited.
   2. Cell phone and pagers must be turned off before entering class and lab. If they go off during class or lab, the student will be excused for the remainder of that class. In addition, if they go off during an exam or quiz, a student will be given a zero for the day and then excused from the class for that day.
8. **Laboratory**:
   1. Students will be asked to keep a laboratory notebook.
   2. Students must read the lab prior to entering the lab and complete designated pre–lab information in their lab notebook.
   3. Laboratory reports will generally be due 1 week (or the next lab period) following completion of the experiment unless otherwise indicated.
   4. Specific laboratory requirements will be discussed during the scheduled course time.
9. **Laboratory Safety (Abbreviated List)**:
   1. No student is allowed to work in the laboratory without a lab instructor present.
   2. Personal protective equipment (PPE), such as protective eyewear (e.g. safety goggles) and gloves will be worn at all times when working with hazardous chemical and biological materials or other hazardous items.
      1. Contact lenses are not recommended.
   3. Dress sensibly.
      1. Close-toed and close-heeled shoes (such as sneakers) are required at all times in the laboratory room.
      2. Sandals, Crocs, and flip-flops are always prohibited in the laboratory. Shoes should have a low and closed heel with a flat bottom. Socks, that cover the ankle, are required.
      3. Chemical resistant aprons or appropriate lab coats (with the underlying clothing) will be worn that completely cover the shoulders, chest, and abdomen. (See instructor for particular details.)
      4. Legs will be covered to the knee or lower.
      5. Loose fitting jewelry or clothing that may become entangled in laboratory equipment or pose any other danger is prohibited.
   4. Food, drink, chewing gum, candy, or tobacco products should not be visibly present in the laboratory room.
      1. Do not put anything in your mouth while working in the laboratory.
   5. Direct contact with any corrosive material will be immediately flushed with lots of water for no less than 15 minutes.
   6. Heating devices, such as Bunsen burners, will only be used when authorized by the instructor.
   7. If special precautions or accommodations are required, please supply documentation from the Office for Students with Disabilities or a medical professional.
      1. Please inform your instructor or supervisor if you have any medical condition that may compromise your safety in laboratory. This can be done in confidence in a meeting between you and your instructor/supervisor.
      2. The laboratory environment often times will involve the use of and/or exposure to chemicals or other hazardous substances/equipment.  If you are pregnant or plan on becoming pregnant during this course and are concerned about your exposure to these chemicals or hazardous substances/equipment, please see your instructor to discuss possible alternative arrangements.  Students are also invited to contact Mr. Ryan Kane, Title IX Coordinator/Equal Opportunity Officer, 407-582-3421, [rkane8@valenciacollege.edu](https://webmail.valenciacollege.edu/OWA/redir.aspx?SURL=LB9zMvs8LLQOnzTY3yLQe1RDL5P-ds6YJXujFmFPNr_uURndXKDSCG0AYQBpAGwAdABvADoAcgBrAGEAbgBlADgAQAB2AGEAbABlAG4AYwBpAGEAYwBvAGwAbABlAGcAZQAuAGUAZAB1AA..&URL=mailto%3arkane8%40valenciacollege.edu), regarding requests for alternative arrangements relating to pregnancy.
   8. Locate and learn how to use all of the safety equipment in the laboratory. This includes, but is not limited to, emergency safety showers, eyewashes, fire extinguishers, fire blankets, emergency shut-off valves, etc.
   9. Do not use any laboratory equipment or materials without proper instruction and/or training and proper supervision.
   10. Notify your instructor or laboratory supervisory personnel if any laboratory equipment is not working properly or is broken or damaged.
   11. Emergency equipment, exits, and aisles will not be obstructed at any time.
   12. Avoid crowding and haste and maintain an environment free from clutter.
   13. Report all spills, accidents and injuries to your instructor other laboratory supervisory personnel immediately, regardless of how minor.
   14. Students will not attempt to clean up chemical spills until consulting with your instructors or laboratory supervisory personnel.
   15. Broken glass will be immediately cleaned up by utilizing a dustpan and broom or other approved device.
       1. Do NOT handle broken glass with your hands.
       2. All broken glass will be placed ONLY in designated broken-glass containers.
   16. Recap all bottles, especially those containing chemicals or biological materials, immediately after use.
   17. Do not deviate from lab procedures or attempt unauthorized experiments without the instructor’s approval.
   18. Do not allow liquids (i.e. water) to come into contact with electrical equipment, outlets, or cords.
       1. Handle electrical cords with dry hands and remove electrical plugs from outlets by pulling on the plug and not the cord.
   19. Wash hands thoroughly with soap and water after handling all chemicals or biological materials.
   20. Clean your work table, other worked-in areas, glassware and equipment used immediately after completion of the experiment or activity.
   21. Dispose of all waste materials into the designated area(s) as instructed.
       1. All solid waste will be disposed of in approved and designated containers. Do NOT use laboratory sinks for disposal of any solid waste.
   22. Liquid wastes will be disposed of in approved and designated containers unless instructed to dispose of into the laboratory sinks.
   23. Turn off all equipment if you leave the lab at any time or at the end of lab.
       1. Check that all water faucets, gas outlets, and/or other valves are turned off before you leave lab.
10. **Honor Code/Plagiarism**:
    1. Plagiarism, or the use of another source’s words and/or ideas without acknowledgement, is sternly prohibited. All assignments done outside of class (including but not limited to projects, homework, labs, or quizzes), which involve sources other than the stated textbook, will require proper bibliographic documentation. Students caught plagiarizing will be dismissed from class with a grade of F. If you have any questions about proper documentation procedures, ask your instructor.
       1. In this course, you may never cut and paste, copy, or write verbatim anything from any source; this includes information from the textbook, lab manual, and all other resources.
    2. Cheating on any assignment will result in dismissal from the course with a grade of F.
       1. Cheating consists of but is not limited to the following:
          1. Completing any exam or quiz with the aid of outside sources, unless specifically designated by the instructor.
          2. Copying of homework, lab notebooks, lab write–ups from another student.
          3. Copying of homework, lab notebooks, lab write–ups from a source without proper bibliographic documentation.

*The above schedule and procedures in this class are subject to change at the instructor’s discretion. 05/16.*