COURSE DESCRIPTION:
This chemistry course includes investigations into the fundamental law, theories, and mathematical concepts of chemistry. Students will meet challenging course standards through varied learning experiences designed to develop their computational skills and conceptual understanding of chemistry. Students will also acquire skills in problem-solving, mathematical reasoning, communication and technology. Students will be required to take the Virginia Standards of Learning Test for chemistry.

Class Meeting Times: MW OR T/Th 2nd Block 9:30-11:05 with alternating Fridays
Location: IALR Room 217 /Lab Room 201
Credits: CHM111-4hr. /CHM112-4hr. Pre requisite: MTH03 or equivalent
Lecture Hours: 3/week Lab Hours: 3/week

COURSE TEXTBOOK and MATERIALS:
3 Ring Binder OR Notebook - for class lecture sessions
Scientific Calculator – (can use those distributed in math class)
(Laboratory notebook for lab sessions is provided for you.)

COURSE CONTENT:
• Ch.1&2 – The Nature of Chemistry & Atoms and Elements – matter, properties, and theories, mass, mole, problem solving, periodic table
• Ch.3 – Chemical Compounds – naming, determining formulas, properties, and percent composition,
• Ch.4 – Quantities of Reactants & Products – balancing chemical reactions, calculating yield of reactions, mole calculations, empirical formulas
• Ch.5 - Chemical Reactions– net ionic equations, redox reactions, activity series, and solution concentration
• Ch. 6- Energy & Chemical Reactions – conservation & enthalpy
• Ch. 7 – Electronic Configuration & the Periodic Table – quantum theory and periodic trends
• Ch. 8&9 – Covalent Bonding & Molecular Structures - bonding, bond properties, Lewis structures, octet rule, VSEPR theory, hybridization, and polarity
• Ch. 10 – Gases & the Atmosphere – kinetic theory, gas laws, gas reactions and gas density
• Ch. 11 – Liquids, Solids, & Materials – phases, vapor pressure, properties of water, and types of solids
• Ch. 13 – Chemical Kinetics – reaction rates, kinetic mechanisms and enzymes
• Ch. 14 – Chemical Equilibrium – equilibrium characteristics and constants, and Le Chatelier’s principle
• Ch.15 - The Chemistry of Solutes & Solutions - solubility, enthalpy, entropy, equilibrium factors, vapor pressure, osmotic pressure and colloids
• Ch.16 & 17 – Acids & Bases & Additional Aqueous Equilibrium – acids, bases, salts, pH, ionization, buffers, titrations, solubility equilibria and product constant, and predicting precipitation
• Ch. 12 – Fuels, Organic Chemicals, & Polymers – organic compounds and their properties
• Ch. 18-22 – Thermodynamics, Electrochemistry, Nuclear Chemistry, Main Group Elements, and Transition Elements
  • NOTE: The order of the content is subject to change at the instructor’s discretion.

**COURSE OBJECTIVES:**

• A mastery of the basic measurement principles and mathematical techniques that are important in problem solving.
• Communication skills used among scientists using basic mechanics of standard written English, basic classification systems for matter and energy, symbols, and physical formulas.
• The use of the scientific method in proceeding from familiar or known information to the unknown.
• The use of scientific tools for data processing, evaluation, and presentation, such as calculators, spreadsheets, and other computer software.
• An understanding and the ability to predict the behavior of matter and energy under various conditions rather than memorization of fact.
• An ability to recognize the investigative nature of science by observing the physical world, striving to interpret observations and integrating ideas into a total understanding of chemistry.
• An appreciation of the interrelationship between chemistry and other disciplines.
• Apply interpersonal skills to work with individuals in group-laboratory experiments.
• Solve problems required by the concepts and principles of chemistry.
• Perform laboratory experiments relevant to the content topics.
• Accurately record and report observations of the results of experiments using appropriate standards of quantification.
• Effectively and safely use laboratory equipment to execute experiments

**GRADING SCALE**

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<th>Grade</th>
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<tr>
<td>A</td>
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**EVALUATION SYSTEM:**
The grade for each six weeks in this course will be determined as follows:

HW Average 10%  Quiz Average 20%  Lab Average 20%  Test Average 50%

Each semester grade will be determined by the three six week’s grades and the semester exam weighted 25% each toward the semester grade. Exams will be cumulative for each semester.

All written assignments will be assessed for spelling, punctuation, grammar, and consistency according to the conventions of Standard English.

**Tests:** A test will be given at the end of each topic to test the overall understanding of the material. Tests will be announced at least one class session in advance. You will only be permitted to use a calculator when allowed by the instructor. Unexcused absences during a test will result in a grade of zero for that test. You must have a written excuse for the absence to be considered excused. If the absence is excused a makeup test will be given as soon as possible. Whenever possible please inform the instructor of known absences so that arrangements can be made for makeup tests.

There will be occasional classroom or outside projects assigned that will be graded as a test depending on the length and type of assignment.
The format of each test will include: multiple choice questions, short answer, true/false and discussions. Test questions will be taken from the chapter text, class notes/discussions, similar homework problems and lab concepts.

**Quizzes:** Some of the topics/chapters covered in chemistry are extensive and required several class periods to cover all the material. Therefore, quizzes will be given in order to break up the material into smaller sections. All quizzes will be announced at least one class session in advance and administered at the beginning of the class session.

**Homework:** To learn chemistry, you must practice problem solving. It is impossible to learn by osmosis (in other words, merely looking at solutions to problems, hearing other classmates explanations, thinking about problems while you listen to the stereo or watch television, etc). THE KEY TO THE CLASS IS READING THE TEXTBOOK AND WORKING PROBLEMS!! Students are to work on the homework problems as each topic is covered but may work ahead if they choose to do so. Problems that prove to be especially difficult will be reviewed in class; however, homework is only graded for completion. The answers to homework problems in blue text are in back of the text. You will be expected to apply your knowledge from one area of chemistry to the next as the year progresses. It is strongly encouraged that students ask questions regarding homework – remember there is no such thing as a dumb question.

**HW Assignments:** The following are the assigned homework problems for each chapter. There may be additions or deletions from this list based on time constraints or covered material.

Ch.1-page 33-40-#11, 12, 21, 23, 28, 35, 37, 39, 40, 53, 54, 61, 75, 76, 84, 85
Ch.2-page 72-75-#8, 15, 18, 24, 25, 26, 28, 32, 39, 48, 50, 53, 55, 57, 58, 66, 67, 84, 92
Ch.3-page 114-121-#2, 3, 6, 9, 10, 20, 22, 35, 39, 45, 55, 58, 61, 64, 73, 75, 84, 87, 88
Ch.4-page 153-162-#2, 8, 14, 16, 21, 26, 29, 31, 32, 38, 43, 51, 54, 62, 69, 73, 79, 81
Ch.5-page 204-212-#2, 11, 17, 23, 24, 36, 37, 40, 45, 54, 61, 65, 67, 72, 81,
Ch.6-page 261-271-#2, 4, 11, 16, 23, 28, 35, 42, 45, 55, 62, 64, 75, 77, 90, 98, 108
Ch.7-page 325-331-#10, 11, 14, 16, 19, 20, 31, 33, 34, 36, 51, 66, 69, 70, 81, 84, 90, 95, 98, 101, 141
Ch.8-page 373-379-#2, 6, 14, 15, 23, 29, 31, 52, 69, 73, 74
Ch.9-page 422-428-#13, 20, 24, 27, 29, 35, 47, 55, 61, 68
Ch.10-page 480-486-#14, 16, 19, 29, 34, 39, 46, 53, 59, 66, 73, 87, 110
Ch.11-page 538-544-#8, 13, 15, 19, 25, 40, 46, 53, 58, 72, 79, 87, 90
Ch.12-page 601-606-#21, 27, 28, 34, 46, 57, 75, 97, 98
Ch.13-page 657-670-#11, 13, 19, 20, 26, 29, 48
Ch.14-page 711-720-#4, 17, 21, 25, 31, 38, 45, 62, 64
Ch.15-page 765-769-#27, 28, 32, 37, 40, 44, 46, 53, 58, 63, 68
Ch.16-page 861-866-#12, 19, 21, 26, 36, 43, 51, 55, 62, 72, 75, 93
Ch.17-page 851-856-#16, 22, 24, 28, 33, 47, 53, 57, 62, 68
Ch.18-22-TBA

**Labs:** Laboratory exercises are vital to understanding the field of chemistry. Laboratory partners will be assigned by the instructor on the first day of lab and will be rotated with each new six weeks. Laboratory safety rules and procedures will be followed at all times. Any deliberate disregard for the laboratory safety rules and procedures will cost you of your lab privilege and a grade of zero will be assigned for the lab in which the event occurred. If warranted, other disciplinary action will be determined by the instructor and the director.

Pre-lab assignments for each lab are required before a student is allowed to begin the lab experiment. The lab experiment handouts will be given at least two days before the labs are to be conducted. The student is to complete the pre-lab assignments alone and not in their lab groups. This is to ensure the student is familiar with the steps in the lab experiment and all safety issues. Copying of another student’s pre-lab assignment will not be permitted. If this occurs, both students involved will receive a zero for that lab.
Lab partners will share duties in the lab such as gathering materials, performing the actual steps of the experiment, recording of data and cleanup. Lab data obtained during the experiment can be shared among your lab partner and/or assigned group. Any lab area not cleaned sufficiently before the students leave for the day will result in a 10 point penalty on that lab experiment for that lab group.

Post-lab analysis/conclusions can be a collaborative effort and all students will be expected to contribute to the discussion. However, each student must write their analysis and conclusion in his/her own words. Some lab experiments will require a formal post-lab report. The format and style of these will be covered prior to those particular labs.

Lab safety is of the highest priority! Safety issues for each lab will be covered prior to the lab and must be included in the pre-lab assignment. Personal protective equipment such as gloves, aprons, safety glasses, and/or safety goggles will be required for all labs. Any student who consistently has to be reminded to wear their personal protective equipment properly or participates in horseplay of any kind will lose their lab privilege for that day and receive a zero for that lab assignment. All students must pass a lab safety test at the beginning of the first semester before they are allowed to work in the lab for that school year.

Any missed labs due to illness or other absence will not be repeated due to time constraints. Therefore, if a student’s absence for a lab is excused a makeup lab report will be assigned on the same subject matter as the lab experiment missed.

This lab report will meet the following requirements:
Typed – 1” margins
3-4 pages – double spaced – 12 font size maximum – Times New Roman or Arial
Small graphs and example data can be included in the report but all pictures, figures, etc should be referenced as an appendices and do not count toward the minimum page length.
3 references – one of these maybe your chemistry book or lab handout

METHODS:
This course will involve the student in an active learning process. As a result, a combination of instructional methods will be utilized. Interactive lectures with problem-solving sessions will be an integral part of the course. In addition, the student will need to conduct laboratory experiments and work at times as a member of a group to be successful. Other methods of instruction may include group discussions and computer aided exercises.

ABSENCES
The PGSMST absence policy will be strictly enforced. It is the student’s responsibility for notes, work and all assignments missed in class during any absences. All students are expected to be prepared for each day regardless of previous class absences. All efforts will be made to accommodate special circumstances should the need arise.

PLAGIARISM
Plagiarism WILL NOT be tolerated!! This includes but is not limited to giving/receiving answers on tests, quizzes, labs; informing students in other classes of the content of a quiz or test; and copying information from another person’s paper or research and passing it on as your own work. The internet is a useful tool but information received from sources on the web must be cited properly. Any student who plagiarizes on any assignment will receive a zero for that assignment and be referred for a conference with the director and his/her parent/guardians.

EXPECTATIONS:
• Each student will be prepared, which includes pencil, paper, calculator, textbook and/or lab notebook.
• Each student will be expected to maintain a clean and organized work area.
• Each student will be expected to promptly and consistently attend class. If a student is absent, it is the student’s responsibility to obtain missed information and assignments.
• Students should inform the instructor of known absences and obtain scheduled assignments.
• Each student will be honest. Discussions of assignments with other class members are a good idea to provoke thought and be exposed to other points of view. However, copying work for each other and from other sources is a direct violation of the honor code.
• Each student will conduct himself or herself in a scholarly manner.
• Each student will be responsible for his or her own behavior to maintain a non-disruptive behavior. This includes turning off of cell phones and pagers.
• Each student will become familiar with Blackboard and utilize this tool for updates to the chemistry syllabus, assignments, schedules, and online assignments.
• Each student will adhere to the laboratory safety rules for this course. The safety rules and emergency procedures will be reviewed the first day of lab. A signed copy by both parent and student must be on file before a student will be allowed to work in the lab.

ADA Accommodations
Every effort will be made to accommodate students with special needs. Please inform the instructor if you need accommodations not currently provided or if the need arises for any special accommodations.

SCHEV Competencies
Writing
Information Literacy
Quantitative Reasoning
Critical Reasoning

DCC Educational Objectives
Communication
Learning Skills
Critical Thinking
Interpersonal Skills and Human Relations
Computational and Computer Skills
Understanding Science and Technology