Southeastern Louisiana University
Dual Enrollment Program--Chemistry

The Southeastern Dual Enrollment Chemistry courses provide students the opportunity to take college Chemistry courses at their high schools and receive credit on their high school and Southeastern transcripts. Southeastern is offering a progressive pair of courses in chemistry during the 2017-2018 academic year. Each course consists of about 130 hours of instruction and practice; schools in which students only meet with the High School Course Facilitator an hour or less per day will not be successful completing a dual enrollment course in just two quarters. The courses are:

**CHEM 101 – General Chemistry I** (for non-science majors). Credit 3 hours. The first of a two semester sequence covering the following general topics: metric and temperature conversions, density, calorimetry, mixtures/compounds/elements, chemical and physical properties, structure of the atom and electron configuration, periodic table, bonding, chemical formulas and nomenclature, moles, stoichiometry, chemical reactions, gas laws, and properties of gases, liquids and solids

**CHEM 102 – General Chemistry II** (for non-science majors). Credit 3 hours. Prerequisite: Chemistry 101. A continuation of Chemistry 101 covering topics such as: solutions, concentrations (% composition and molarity), acids/bases, pH, buffers, kinetics, equilibrium, solubility, oxidation/reduction, nuclear chemistry, and an introduction into organic chemistry and biochemistry.

**Program Requirements**

**From the High School:**
- A computer lab must be available to all Dual Enrollment chemistry classes two times per week (or once per week if another day per week is devoted to solving homework problems on paper) for the practice portion of the course. This can be a hard-wired classroom or a wireless cart.

**From the Facilitator:**
- Any facilitator new to the program must complete the corresponding workshop during the summer at Southeastern’s main campus in Hammond.
- Any facilitator already in our program who would like to participate in a new class must complete the workshop for that new class during the summer at Southeastern’s main campus.
- All facilitators (new and returning) must attend a ½ day workshop at the end of the summer to copy all online course materials and receive any revisions to the Student Eligibility Guidelines.
- The facilitator(s) must ensure that their students meet the program requirements as outlined in the Dual Enrollment Student Eligibility Guidelines (website) and follow the guidelines of the program laid out in the Memorandum of Understanding (copy given to the principal).
- The facilitator must be certified in the discipline for the course they wish to facilitate.

**From the Students:**
- Students must be in the 11th or 12th grade.
- Students must be on track to complete the Core 4 curriculum with no developmental coursework required.
- Students must have an ACT, PLAN or Pre-ACT Composite score of 18 or greater (ASPIRE ≥ 430)
- Students must have an ACT, PLAN or Pre-ACT Mathematics sub-score of 19 or greater (ASPIRE ≥ 431)
- Students must be enrolled in a high school chemistry course while dual enrolled
- To enroll in CHEM 102, the student must have successfully completed CHEM 101 with a ‘D’ or better.

**2017 Summer Workshops for Dual Enrollment Chemistry**

<table>
<thead>
<tr>
<th>Session Title</th>
<th>Dates</th>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry I</td>
<td>June 13, 2017</td>
<td>Mandatory for all new CHEM101 Dual Enrollment</td>
</tr>
<tr>
<td>(Chem 101)</td>
<td>9am – 3pm</td>
<td>Chemistry High School Course Facilitators</td>
</tr>
<tr>
<td>General Chemistry II</td>
<td>June 14, 2017</td>
<td>Mandatory for all new CHEM102 Dual Enrollment</td>
</tr>
<tr>
<td>(Chem 102)</td>
<td>9am – 3pm</td>
<td>Chemistry High School Course Facilitators</td>
</tr>
<tr>
<td>½ Day Workshop</td>
<td>July 25, 2017</td>
<td>Mandatory for all Dual Enrollment Chemistry High</td>
</tr>
<tr>
<td></td>
<td>9 am – 12pm</td>
<td>School Course Facilitators</td>
</tr>
</tbody>
</table>

**Note:**
Once a high school course facilitator has completed the workshop for a particular course, he or she does not have to repeat that workshop in subsequent summers. The only mandatory workshop for a returning facilitator, who does not wish to facilitate a new course, is a ½ day workshop at the end of the summer. This ½ day workshop must be repeated each summer.
CHEM 101 is a hybrid course with all content delivered online through SaplingLearning.com OR face-to-face by Southeastern faculty. The Southeastern instructor of record will develop course content and provide powerpoint notes, ungraded instructional assignments, ungraded quizzes that are similar to exams, and exam study guides on SaplingLearning.com to help prepare students to complete the graded assignments and the exams which are also provided by the Southeastern instructor of record. The high school teachers will act as a facilitator and assist with student registration and enrollment, proctor exams as necessary, and through supplemental instruction, serve as a daily learning resource for students as they assimilate course content. The students’ final course grades are assigned by the instructor of record.

This course requires purchase of a semester of online access at SaplingLearning.com (~$25). High School facilitators will submit roster and SaplingLearning will create student accounts and bill the high school.

This course requires a Scientific Calculator with square root and scientific notation (eg. TI-30X or Casio FX-260) High School Course Facilitators may choose to require a specific model for ease in teaching how to enter calculations

Student Learning Outcomes: After the completion of this course, students will be able to:

- Define the term chemistry and identify substances as chemicals.
- Describe some chemical and physical properties of matter.
- Describe the activities that are part of the scientific method.
- Write the names and abbreviations for the metric or SI units used in measurements of length, volume, mass, temperature and time.
- Write a number in scientific notation.
- Identify a number as measured or exact; determine the no. of significant figures in a measured number.
- Adjust calculated answers to give the correct number of significant figures.
- Use conversion factors to change from one unit to another.
- Calculate the density of a substance; use density to calculate mass or volume of a substance.
- Given a temperature, calculate a corresponding temperature on another scale.
- Classify matter as pure substances or mixtures.
- Given the name of an element, write its correct symbol; from the symbol, write the correct name.
- Use the periodic table to identify the group and the period of an element and decide whether it is a metal or a nonmetal.
- Understand Dalton’s atomic hypothesis and the relevance of early experiments (cathode rays, electrolysis, oil drop, x-rays, radioactivity, etc.) toward developing a model of the atom.
- Describe the electrical charge and location in an atom for a proton, a neutron, and an electron.
- Given the atomic number and mass number of an atom, state the number of protons, neutrons, and electrons.
- Give the number of protons, electrons, and neutrons in the isotopes of an element.
- Explain how atomic masses were defined and the standard by which atomic masses are presently defined.
- Define and discuss electromagnetic radiation (waves) and properties; discuss the electromagnetic radiation spectrum in terms of frequencies and wavelengths from radio waves to cosmic rays.
- Explain how atomic spectra correlate with energy levels in atoms.
- Describe the energy levels, sublevels, and orbitals in atoms.
- Write the orbital diagrams and electron configurations.
- Use the electron configurations of elements to explain periodic trends.
- Predict the number of valence electrons for a representative element given its position on the periodic table.
- Using the octet rule, predict the ion charge of simple ions for the representative elements.
- Using charge balance, write the correct formula for an ionic compound.
- Given the formula of an ionic compound, write the correct name; given the name of an ionic compound, write the correct formula.
• Write a formula of a compound containing a polyatomic ion.
• Given the formula of a covalent compound, write its correct name; given the name of a covalent compound, write its formula.
• Diagram the Lewis structure for covalent molecules.
• Write Lewis structures for covalent molecules or ions with multiple bonds and show resonance structures.
• Predict the shape of a molecule using VSEPR.
• Use electronegativity to determine the polarity of a bond.
• Classify a molecule as polar or nonpolar.
• Identify types of intermolecular forces and compare their relative strengths
• Use Avogadro’s number to convert between particles and moles.
• Given the chemical formula of a substance, calculate its molar mass.
• Use molar mass to convert between mass and moles.
• Given the formula of a compound, calculate the percent composition.
• Determine the empirical formula and molecular formula of a compound using appropriate data.
• Identify a change in a substance as a chemical or physical change.
• Write and balance chemical equations for chemical reactions.
• Identify types of chemical reactions and predict their products.
• Given a quantity in moles of reactant or product, use mole-mole factors from the balanced equation to calculate the moles of another substance in the reaction.
• Use stoichiometry to determine the amount (moles, mass or volume) of reactants or products involved in a chemical reaction given appropriate data.
• Given the actual quantity of product, determine the percent yield for a reaction.
• Describe different forms of energy and identify units of energy.
• Use specific heat to calculate heat loss or gain, temperature change, or mass of a sample.
• Describe solids, liquids, and gases at the level of the bulk material and at the level of the particle.
• Describe the attractive forces between ions, polar molecules, and nonpolar molecules.
• Describe various phase changes and calculate the energy involved.
• Describe the energy changes in exothermic and endothermic reactions.
• Describe the kinetic theory of gases and the properties of gases.
• Define pressure and the units involved.
• Understand and apply the gas laws involving pressure, volume, temperature, and amount of a gas.
• Use the ideal gas law to solve for \( P, V, T \), or \( n \) of a gas when given 3 of 4 values in the ideal gas equation.
• Determine the amount (moles, mass or volume) of a gas that reacts or forms in a chemical reaction.
• Use partial pressures to calculate the total pressure of a mixture of gases.
• Understand vapor pressure and its relationship to boiling point.

Exams: There will be three 100-point unit exams and a 100-point final exam. Only the two highest exam grades will be used to calculate your final grade. The three unit exams will cover material from several chapters of the course. The final exam is comprehensive and will cover the entire course. Exams will be administered via SaplingLearning and grades will be posted on SaplingLearning. There will be 200 total points from unit exams and 100 total points from the final exam.

Assignments: Twelve assignments worth 100 points will be given (one for each chapter). Assignments are designed to test your understanding of material that has been presented. Assignments are available via SaplingLearning. The highest eleven assignment grades will be averaged and the average will be worth 100 points.

Grade scale: [90-100% = A ] [ 80-89% = B ] [ 70-79% = C ] [ 60-69% = D ] [ < 60% = F ]
Grades will be posted on SaplingLearning at the completion of the unit. The Instructor of record will report final grades in LeoNet.

Make-ups: There will be no individual make-up exams given to students without a valid excuse. Students that possess a valid medical excuse or school excuse may be allowed to take a make-up exam (alternative assessment methods maybe used at my discretion). Make-ups will only be allowed within 1 week of the excused absence. There will be no make-ups for in class work and no extensions for outside class assignments without valid excuses or prior consent of the instructor. (You get to drop your lowest unit exam and assignment).

Academic Dishonesty: Schools agree that the first incident of academic dishonesty in any course by any student in any manner will result in a grade of 0 on the assessment in question. The second incident will result in the student’s failing the Southeastern portion of the course. Southeastern’s Academic Dishonesty Policy:
Students are expected to maintain the highest standards of academic integrity. Behavior that violates these standards is not acceptable. Examples are the use of unauthorized material, communication with fellow students during an examination, attempting to benefit from the work of another student and similar behavior that defeats the intent of an examination or other class work. Cheating on examinations, plagiarism, improper acknowledgement of sources in essays, and the use of a single essay or paper in more than one course without permission are considered very serious offenses and shall be grounds for disciplinary action as outlined in the current General Catalogue of Southeastern Louisiana University
http://www.southeastern.edu/resources/policies/policy_detail/acad_integrity.html

Attendance: Students should refer to the University policy on attendance as stated in the current SLU catalogue. Attendance will be taken at the beginning of each class. If you cannot attend lectures regularly, you should consider dropping the class. **It is your responsibility to complete and file drop forms with you high school course coordinator if you wish to withdraw from the class.** The last day to withdraw from the class for Fall semester classes is Friday, November 3rd, 2017 and for Year-long and Spring semester classes is March 23rd, 2018.

Grade Appeals: Should a student have a concern about a final grade posted for a dual enrollment course, the Grade Appeals policy should be followed below. Please note that a student has 30 days to make a written appeal to the Southeastern Instructor of Record:

After a final course grade is recorded in the Records and Registration Office, a change of grade must be approved in sequence by the instructor of record, the instructor’s department head, and the academic dean of the College of Science and Technology. In the event of a contested final course grade, a student's written appeal of the grade must be submitted to the instructor within thirty (30) calendar days of final grades for the term being due. The grade appeal should also be submitted to Dr. Jeffrey Temple, Assistant Vice President for Academic Programs. For more information about grade appeals, see http://www.southeastern.edu/resources/policies/policy_detail/instruction_practices.html

Material to be covered on exams: unit exams and the final exam will be given online through SaplingLearning

**Exam I Material:**
- Chapter 1: Chemistry and the Scientific Method
- Chapter 2: Measurement
- Chapter 3: Energy and Matter
- Chapter 4: Atoms and the Periodic Table

**Exam II Material:**
- Chapter 5: Naming Compounds
- Chapter 6: Chemical Quantities
- Chapter 7: Chemical Reactions
- Chapter 8: Stoichiometry

**Exam III Material:**
- Chapter 9: Electron Configurations and Periodicity
- Chapter 10: Chemical Bonding
- Chapter 11: Gases
- Chapter 12: Intermolecular Forces and Effects

**Final Exam Material:**
- Chapters 1-12.

**Important dates for the semester:**
http://www.southeastern.edu/future_students/dual_enrollment/calendar/index.html

<table>
<thead>
<tr>
<th>Important Dates for CHEM 101</th>
<th>Fall Semester 2017</th>
<th>Year-long 2017-2018</th>
<th>Spring Semester 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last day to enroll</td>
<td>August 27, 2017</td>
<td>August 27, 2017</td>
<td>January 21, 2018</td>
</tr>
<tr>
<td>Last day to DROP</td>
<td>September 3, 2017</td>
<td>September 3, 2017</td>
<td>January 28, 2018</td>
</tr>
<tr>
<td>Last day to confirm rosters</td>
<td>September 6, 2017</td>
<td>September 6, 2017</td>
<td>January 31, 2018</td>
</tr>
<tr>
<td>Exam 1*</td>
<td>September 15, 2017</td>
<td>November 8, 2017</td>
<td>February 15, 2018</td>
</tr>
<tr>
<td>Exam 2*</td>
<td>October 20, 2017</td>
<td>February 22, 2018</td>
<td>March 22, 2018</td>
</tr>
<tr>
<td>Last day to Withdraw</td>
<td>November 3, 2017</td>
<td>March 23, 2018</td>
<td>March 23, 2018</td>
</tr>
<tr>
<td>Exam 3*</td>
<td>December 1, 2017</td>
<td>May 1, 2018</td>
<td>April 26, 2018</td>
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<tr>
<td>Final Exam*</td>
<td>December 7, 2017</td>
<td>May 10, 2018</td>
<td>May 10, 2018</td>
</tr>
</tbody>
</table>

* High School Facilitators can choose exact date of exams, but they should be completed by this date.
Instructor of Record: Santino Ladogana or Georgina Little
Email: Santino.Ladogana@southeastern.edu Georgina.Little@southeastern.edu
Phone: 985-549-3939 985-549-2161
Prerequisite: CHEM 101 (see additional information above)

Chem 102 – General Chemistry II
Southeastern Dual Enrollment Program
2017-2018

CHEM 101 is a hybrid course with all content delivered online through SaplingLearning.com OR face-to-face by Southeastern faculty. The Southeastern instructor of record will develop course content and provide powerpoint notes, ungraded instructional assignments, ungraded quizzes that are similar to exams, and exam study guides on SaplingLearning.com to help prepare students to complete the graded assignments and the exams which are also provided by the Southeastern instructor of record. The high school teachers will act as a facilitator and assist with student registration and enrollment, proctor exams as necessary, and through supplemental instruction, serve as a daily learning resource for students as they assimilate course content. The students’ final course grades are assigned by the instructor of record.

This course requires purchase of a semester of online access at SaplingLearning.com (~$25). High School facilitators will submit roster and SaplingLearning will create student accounts and bill the high school.

This course requires a Scientific Calculator with square root and scientific notation (eg. TI-30X or Casio FX-260) High School Course Facilitators may choose to require a specific model for ease in teaching how to enter calculations

Student Learning Outcomes: After the completion of this course, students will be able to:

• Define solute and solvent; describe the formation of a solution.
• Identify solutes as electrolytes or nonelectrolytes.
• Define solubility; distinguish between an unsaturated and a saturated solution. Identify an insoluble salt.
• Understand and perform calculations involving concentration, including mass percent and molarity.
• Given the volume and molarity of a solution, calculate the amount of another reactant or product in the reaction.
• Perform calculations involving dilutions of solutions.
• Describe how temperature, concentration, and catalyst affect the rate of a reaction.
• Use the concept of reversible reactions to explain chemical equilibrium.
• Calculate the equilibrium constant for a reversible reaction given the concentrations of reactants and products at equilibrium.
• Use an equilibrium constant to predict the extent of reaction.
• Use Le Chatlier’s principle to describe the changes made in equilibrium concentrations when reaction conditions change.
• Calculate the solubility product for a saturated solution; use the solubility product to calculate molar ion concentrations.
• Describe and name acids and bases using the Arrhenius and the Bronsted-Lowry concepts.
• Identify conjugate acid-base pairs for Bronsted-Lowry acids and bases.
• Write equations for the dissociation of strong and weak acids; identify the extent of reaction.
• Write the equilibrium expression for a weak acid or weak base.
• Use the ion product of water to calculate the [H₃O⁺] and [OH⁻] in an aqueous solution.
• Calculate pH, [H₃O⁺], and [OH⁻] of a solution from appropriate data.
• Write balanced equations for reactions of acids and bases.
• Calculate the molarity or volume of an acid or base from titration information.
• Predict whether a salt will form an acidic, basic, or neutral solution.
• Describe the role of buffers in maintaining the pH of a solution.
• Identify oxidation, reduction, oxidizing agents, and reducing agents in redox reactions.
• Assign an oxidation number to all the atoms in a compound.
• Balance oxidation-reduction equations (including ones in acidic or basic conditions).
- Write the half-reactions that occur at the anode and cathode of a voltaic cell.
- Describe the half-cell reactions and the overall reactions that occur in electrolytic cells.
- Predict whether a reaction will occur spontaneously.
- Write a balanced chemical equation for a spontaneous reaction.
- Describe alpha, beta, and gamma radiation.
- Write nuclear equations for radioactive decay.
- Describe the detection and measurement of radiation.
- Perform half-life calculations for radioisotopes.
- Describe the practical applications of radioisotopes.
- Describe the processes of nuclear fission and fusion.
- Differentiate properties and characteristic of organic or inorganic compounds.
- Classify organic molecules according to their functional groups, including alkanes, alkenes, alkynes, alcohols, ethers, aldehydes, ketones, carboxylic acids, esters, amines and amides.
- Write the IUPAC and/or common names for the functional groups listed above.
- Draw structural, condensed and line formulas of the functional groups listed above.
- Describe the bonding in benzene; name aromatic compounds and write their structural formulas.
- Classify alcohols as primary, secondary, or tertiary.
- Identify and predict products for selected addition and condensation organic reactions.
- Understand the classification schemes for carbohydrates.
- Describe the monosaccharide units and linkages in disaccharides.
- Describe structure and properties of lipids.
- Describe protein functions, and draw the generic structure for amino acids monomers and the peptide linkage.
- Identify the levels of structure of a protein.
- Describe the role of an enzyme in an enzyme-catalyzed reaction.
- Describe the structures of the nucleic acids in DNA and RNA.
- Describe protein synthesis.

Exams: There will be three 100-point unit exams and a 100-point final exam. Only the two highest exam grades will be used to calculate your final grade. The three unit exams will cover material from several chapters of the course. The final exam is comprehensive and will cover the entire course. Exams will be administered via SaplingLearning and grades will be posted on SaplingLearning. There will be 200 total points from unit exams and 100 total points from the final exam.

Assignments: Seven assignments worth 100 points will be given (one for each chapter). Assignments are designed to test your understanding of material that has been presented. Assignments are available via SaplingLearning. The highest six assignment grades will be averaged and the average will be worth 100 points.

Grade scale: [90-100% = A] [80-89% = B] [70-79% = C] [60-69% = D] [< 60% = F]
Grades will be posted on SaplingLearning at the completion of the unit. The Instructor of record will report final grades in LeoNet.

Make-ups: There will be no individual make-up exams given to students without a valid excuse. Students that possess a valid medical excuse or school excuse may be allowed to take a make-up exam (alternative assessment methods maybe used at my discretion). Make-ups will only be allowed within 1 week of the excused absence. There will be no make-ups for in class work and no extensions for outside class assignments without valid excuses or prior consent of the instructor. (You get to drop your lowest unit exam and assignment).

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Material to be covered on exams: unit exams and the final exam will be given online through SaplingLearning

Exam I Material:
- Chapter 13: Solutions
- Chapter 14: Chemical Equilibrium
- Chapter 15: Acids and Bases

Exam II Material:
- Chapter 16: Reduction-Oxidation
- Chapter 17: Nuclear Radiation

Exam III Material:
- Chapter 18: Organic Chemistry
- Chapter 19: Biochemistry

Final Exam Material:
- Chapters 1-12.

Important dates for the semester: [http://www.southeastern.edu/future_students/dual_enrollment/calendar/index.html](http://www.southeastern.edu/future_students/dual_enrollment/calendar/index.html)