

| Course Department  | CHEM  | Course Number | <b>122</b>   | Course Credit Hours   | 4 |
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| <b>WNC Catalog Course Description</b>                                      | Provides fundamentals of chemistry including solutions, kinetics, equilibria, thermodynamics, electrochemistry, nuclear chemistry and properties of inorganic and organic compounds. Three hours lecture/three hours laboratory.  |               | <b>Course Transferability</b>                        | This course is designed to apply toward a WNC degree and/or transfer to other schools within the Nevada System of Higher Education, depending on the degree chosen and other courses completed. It may transfer to colleges and universities outside Nevada. For information about how this course can transfer and apply to your program of study, please contact a counselor. |   |
| <b>Minimum Lecture Hours per Week (16 week Semester)</b>                   | Three hours of Lecture  |               | <b>Minimum Lab Hours per Week (16 week Semester)</b> | Three hours of Laboratory.  |   |
| <b>Minimum Lecture Hours per Week (8 Week Semester)</b>                    | Six hours of Lecture.   |               | <b>Minimum Lab Hours per Week (8 week Semester)</b>  | Six hours of Laboratory.  |   |
| <b>Minimum Lecture Hours per Week (3 Week Semester)</b>                    | 16.25 hours of Lecture.   |               | <b>Minimum Lab Hours per Week (3 week Semester)</b>  | 16.25 hours of Laboratory.  |   |
| <b>Pre-Requisite or Co-Requisite Courses (if the latter is applicable)</b> | CHEM 121 & MATH 126 & MATH 127, or CHEM 121 and MATH 128, with a minimum grade of "C" or better in the CHEM and MATH pre-requisite courses.   |               |  |   |   |
| <b>Faculty Comment</b>   | <p><b>PERSPECTIVE:</b> CHEM 100 (a different <b>non-major's</b> course) is a one semester overview of elementary CHEM and is about equivalent to one (1) year of high school CHEM.</p> <p><b>PERSPECTIVE: CHEM 122 is university-transfer and is 10-15 times as intense as CHEM 100!</b></p> <p><b>PERSPECTIVE:</b> CHEM 122 covers the gamut of degree requirements: BCH; BIOL; CHEM; CHEM ENG; General Education; Genetics; NUTR; RWF; PHYS; Pre-DVM/Pre-DC/PreOD/Pre-R.Ph; Pre-MD/Pre-DO/Pre-DDS; Pre-NURS; Pre-PT.</p>  |               |  |   |   |
| <b>Identify Any Risk Management Issues</b>                                 | Risk of minor physical injury (skin laceration) due to glass breakage; risk of minor physical injury (skin) due to the use of common mineral acids and bases; risk of serious physical injury if student fails to wear proper goggles (eyes) and lab coat (skin); risk of moderate injury if student fails to put hair up out of the way (skin); risk of moderate physical injury if student fails to wear proper foot wear (skin); risk of minor to severe physical injury due to fire/burn (Bunsen burners, pyrophoric compounds and skin).                               |               |  |   |   |
| <b>Lab Safety Supplies REQUIRED</b>  | <b>Purchased at the WNC Bookstore. ALL Students: Tyvek Lab Coat and UVEX Safety/Chemical Splash Goggles with Indirect Venting; Anatomy and Physiology Students: Nitrile Gloves (Best Price is at WalMart or An Auto Parts Store) – NO Deviations from These Items!</b>  |               |  |   |   |
| <b>Course Topics</b>   | All students will have a basic (second semester of a two semester laboratory-based course) knowledge of the Principles of Solutions, Solubility, Colligative properties, Kinetics, Chemical equilibrium, Applications of aqueous equilibria including acid-base equilibria and solubility product; Basic thermodynamics, electrochemistry, and nuclear chemistry; Properties of inorganic and organic compounds; Qualitative analysis; Applications to biologically important molecules; and Have practiced the laboratory methods needed to observe and measure the above. |               |  |   |   |

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| <p><b>General Education Course Goals/Outcomes/Objectives</b></p>       | <p>Upon successful completion of CHEM 122, General Chemistry II, (defined as a 75% course score or better) learners will be able to:</p> <p>Describe, identify and apply balanced college freshman level reduction-oxidation reactions to electrochemical applications (GESLO #1; ISLO #1);</p> <p>Illustrate and explain the role solubility and acid-base balance plays in solution chemistry (GESLO #1, #4; ISLO #1, #4, #7);</p> <p>Illustrate and explain the role thermodynamics and kinetics play in determining reaction direction (GESLO #1, #4; ISLO #1, #4, #7);</p> <p>Illustrate and explain introductory organic and biological chemistry reactions of a fundamental nature (GESLO #1, #4, #8; ISLO #1, #4, #7);</p> <p>Draw conclusions with basic calculations of and from general chemistry and qualitative analysis laboratory experiences to develop problem solving in a systematic manner (GESLO #1, #4; ISLO #1, #4, #7).</p> |
| <p><b>Course Broad-Based Student Learning Outcomes</b></p>             | <p>Students will explain and apply chemical principles of intermolecular forces, kinetics, equilibrium, acid/base chemistry, thermodynamics, and electrochemistry.</p> <p>Students will explain and predict patterns of chemical properties and reactivity.</p> <p>Students will apply basic mathematics and algebra to chemical concepts and problem solving.</p> <p>Students will apply the scientific method in a laboratory setting to interpret data and draw conclusions based on the course topics.</p> <p>The properly prepared student will be able to complete these activities at or above a minimum level of 75% on an appropriate assessment tool.</p>   |
| <p><b>Student Performance/Assessment Tool[s]</b></p>                   | <p>Daily Work Sheets, Laboratory Experiments and Exams as described below.</p>  |
| <p><b>Minimum Studying Time Required (per day! 7 days a week!)</b></p> | <p>The general rule of thumb in higher academics/education for appropriate student studying time necessary for learning to occur in a college/university transfer course is 3 hours a week for every hour that a student is in lecture and/or lab. For a traditional science lab-based course, that means a minimum of 18 hours ... even better: 3 hours every day of the week. For an 8 week course, that goes up to 6 hours a day. For a three week summer course, you go to class and lab, study and sleep.</p>  |
| <p><b>Course Linkage to Academic Degree Program[s]</b></p>             | <p><b>General Education Mission:</b><br/>CHEM 122 is a general education course that provides students who complete degrees and certificates with critical life skills that will benefit them in their personal and professional endeavors.</p> <p><b>General Education Student Learning Outcome[s]:</b><br/>See Above (<b>General Education Course Goals/Outcomes/Objectives</b>) Section</p> <p><b>Program Mission for AA/AS degree:</b><br/>CHEM 122 satisfies the A.A./A.S. degree mission by providing academic knowledge and skills for successful transfer students to meet higher educational goals.</p>  |
| <p><b>Lecture and Lab Experiment Source</b></p>                        | <p><a href="http://www.drcarman.info">http://www.drcarman.info</a></p>  |

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|   | Dr. Carman uses no traditional textbooks or lab books: this saves the students money and keeps information more fluid and current. |
| <b>Free, Web-Based Textbook If You So Desire – NOT Required</b> | Open Stax <a href="#">General Chemistry Text</a>   |

### Grading Scale

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| <p>96-100% = A<br/> 91-95% = A-<br/> 87-90% = B+<br/> 83-86% = B<br/> 79-82% = B-<br/> 75-78% = C Above the minimum course score of 75% is a properly prepared student.<br/> 71-74% = D 74% or below for the course is an improperly prepared student.<br/> ≤ 70% = F</p> |
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NOTE: Review the link for "[The Prisoner's Dilemma](#)", as I'm considering a variation of it for CHEM 122 if "W's" or "Walk-away F's" go above an unspecified, as yet, percentage in the course, cf, also, Section VII of Dr. Carman's Rules

### Grade Assignment and Distribution to Required Work

| Assignment   | Comment(s) (ALL Exams Cumulatively Comprehensive)   | Due Dates   | Points Possible | Points Earned by Student |
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| Pre-Test Assessment  | First Day of Lecture; bring a non-programmable calculator and pencils                         |   |                 |                          |
| ACS Standardized Final Exam Post-Course Assessment   | Per ACS Design; Dr. Carman provides Scantron for grading; students don't see the exam, again. | Wednesday During your Regular Lab Period in the 16 <sup>th</sup> week -- RTBA | 200             |                          |
| Lab Practical Exam   | TBA/D   | Last week of Classes (Week 15 Lab Period)                                     | 200             |                          |
| <b>Daily Work Sheets</b>   | <b>See Notes Following.</b>   |   | 225             |                          |
| <p>CHEM 122 is a "non-traditionally flipped class". Day 1 of lecture, you will need your <b>non-programmable calculator</b> and pencils – no excuses accepted for not having this item with you!! This includes late enrollers! Due diligence is the responsibility of every student.</p> <p>There will be 30-45 Daily Work Sheets (1, more or less, per lecture period of the 15 weeks of instruction; the 16<sup>th</sup> week of the semester is exam time). The Daily Work Sheets will be emailed to the student using the student's email address in myWNC on Saturday (due the following Tuesday) and Tuesday (due the following Thursday) evenings. (<b>Make sure your email address in myWNC is working properly as there is no excuse to come empty-handed to class!</b>) They are due fully completed when you walk into class on the due dates. Incomplete work is not accepted and is a zero.</p> <p>Reading assignments will be posted on Dr. Carman's website and students are expected to have completed, studied and learned the reading assignments in advance of the lecture period, as well as to have completed the worksheets.</p> <p><b>Student questions about the reading assignments are to be covered in office hours prior to class time, i.e., students are expected to attend office hours on a regular basis.</b> The Daily Work Sheets will</p> |   |   |                 |                          |

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| <p>cover the reading assignments and may be cumulative in design. Student questions while working on the Daily Work Sheets are strongly encouraged and welcomed!</p>  |  |     |  |
| <p>The structure for the Daily Work Sheets is as follows: the lecture period will be spent having students put (show) their work on the board for class discussion. Everyone must participate in the board work. Failure to participate on the board results in a 5 point loss for every declination.</p> <p>In order to obtain credit for the Daily Work Sheets, each student will turn in their completed worksheet[s]) to Dr. Carman before they leave class.</p> <p>Daily Work Sheets will be returned to students upon recording per Dr. Carman's Rules and Guidelines.</p> <p>Should an occasion arise that there is an odd person out for grouping purposes, Dr. Carman will adjust as necessary the number/blending of a group.</p> <p>Please remember that if you "W" from the course that it would be most courteous and respectful of you to contact your partner and Dr. Carman so that adjustments may be made in the classroom.</p> |  |     |  |
| Experiments   | <p>Due at the beginning of the following lab period. There are 15 experiments, each is worth 8 points apiece. Keep in mind that the lab period is over at the scheduled time: plan your time accordingly as labs not completed by or before that time will receive a zero (0) for that day's lab experiment grade.</p> | 120 |  |
| Total Possible Points in the Course   |  | 745 |  |
| <p>To determine your course per cent: <math>[(\text{the points you earned}^*)/745]*100 = \text{your per cent}</math>. Compare to the grading scale above to determine your grade. *Remember that class participation points are added or subtracted here.</p>   |  |     |  |