

**NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE**

**COURSE SYLLABUS**

**Course Title:** General Chemistry II

**Course #:** CHE\* 122

**Course Description:** 4 semester hours (3 class hours, 3 laboratory hours). Principles, theories, and laws of chemistry dealing with chemical bonding, molecular formation, periodic trends, states of matter, gas laws, and thermochemistry.

**Pre-requisite:** General Chemistry I, MAT\* 137 Intermediate Algebra, and ENG\*073 or satisfactory scores on placement tests.

**Co-requisite:** Must be taken concurrently with CHE\* 122 lab.

**Goals:** This course will provide students with knowledge of the fundamentals of general chemistry. Along with General Chemistry I, this course is intended to provide the basic knowledge of chemistry that is required for careers in natural and physical sciences, medicine, and many other related fields of science and technology.

**Outcomes:** Upon completion of this course, the student will demonstrate ability to:

<b>SOLUTIONS</b>	<ol style="list-style-type: none"><li>1. Calculate solution concentration using percent mass, molarity and molality.</li><li>2. Explain factors that influence solubility of ionic solids and gases.</li><li>3. Predict freezing point depression and boiling point elevation.</li><li>4. Define colloid, hydrophobic, and hydrophilic.</li></ol>
<b>CHEMICAL KINETICS</b>	<ol style="list-style-type: none"><li>1. Calculate the rate of a chemical equation</li><li>2. Write and explain rate laws for chemical reactions</li><li>3. Calculate reactant concentration over time</li><li>4. Explain activation energy and temperature dependence of rate constants</li><li>5. Explain and apply reaction mechanisms</li><li>6. Define catalysts</li></ol>
<b>CHEMICAL EQUILIBRIUM</b>	<ol style="list-style-type: none"><li>1. Explain the concept of equilibrium</li><li>2. Calculate equilibrium constants and equilibrium concentrations</li><li>3. Explain the relationship between chemical kinetics and chemical equilibrium.</li><li>4. Explain factors that affect equilibrium</li></ol>
<b>ACIDS AND BASES</b>	<ol style="list-style-type: none"><li>1. Apply Brønsted and Lewis definition of acids and bases.</li><li>2. Calculate pH, pOH, <math>[H^+]</math>, and <math>[OH^-]</math></li><li>3. Explain the strength of acids and bases</li><li>4. Calculate ionization constants for weak acids and bases</li><li>5. Calculate ionization constants from conjugate acids and bases</li><li>6. Explain the acid-base properties of salts, hydroxides, and oxides</li></ol>

<b>ACID-BASE EQUILIBRIA AND SOLUBILITY EQUILIBRIA</b>	<ol style="list-style-type: none"> <li>1. Explain homogeneous and heterogeneous solution equilibria</li> <li>2. Apply the common ion effect</li> <li>3. Define buffers</li> <li>4. Calculate solubility equilibria and how temperature and pH affect it.</li> </ol>
<b>ENTROPY, FREE ENERGY, AND EQUILIBRIUM</b>	<ol style="list-style-type: none"> <li>1. Explain and apply the second law of thermodynamics</li> <li>2. Calculate entropy and Gibbs free energy</li> <li>3. Apply Gibbs free energy to find out when a reaction is spontaneous</li> <li>4. Explain the thermodynamics in living systems</li> </ol>
<b>ELECTROCHEMISTRY</b>	<ol style="list-style-type: none"> <li>1. Explain redox reactions and galvanic cells.</li> <li>2. Explain the thermodynamics of redox reactions</li> <li>3. Calculate the electromotive force using standard reduction potentials</li> <li>4. Define batteries, corrosion, and electrolysis</li> </ol>
<b>NUCLEAR CHEMISTRY</b>	<ol style="list-style-type: none"> <li>1. Explain the nature of nuclear reactions and nuclear stability</li> <li>2. Apply kinetics to nuclear reactions</li> <li>3. Explain nuclear fission and fusion</li> <li>4. Explain use of isotopes</li> </ol>
<b>CHEMISTRY IN THE ATMOSPHERE</b>	<ol style="list-style-type: none"> <li>1. Define ozone depletion, greenhouse effect, photochemical smog, acid rain, and indoor pollution</li> <li>2. Explain the effect of volcanos on the atmosphere</li> <li>3. Explain the composition of earth's atmosphere and the phenomena of the outer atmosphere.</li> </ol>
<b>TRANSITION METALS CHEMISTRY AND COORDINATION COMPOUNDS</b>	<ol style="list-style-type: none"> <li>1. Explain the chemistry and properties of transition metals</li> <li>2. Explain what a coordination compound is</li> <li>3. Apply molecular geometry to coordination compounds</li> <li>4. Explain reactions of coordination compounds and their applications</li> </ol>
<b>ORGANIC CHEMISTRY</b>	<ol style="list-style-type: none"> <li>1. Apply chemical nomenclature to simple aliphatic and aromatic organic compounds</li> <li>2. Complete the reactions of simple aliphatic and aromatic organic compounds</li> </ol>
<b>SYNTHETIC AND NATURAL ORGANIC POLYMERS</b>	<ol style="list-style-type: none"> <li>1. Explain the properties of polymers</li> <li>2. Describe synthetic and biological polymers</li> </ol>

## College Policies

**Plagiarism:** Plagiarism and Academic Dishonesty are not tolerated at Northwestern Connecticut Community College. Violators of this policy will be subject to sanctions ranging from failure of the assignment (receiving a zero), failing the course, being removed/expelled from the program and/or the College. Please refer to your “Student Handbook” under “Policy on Student Rights,” the Section entitled “Student Discipline,” or the College catalog for additional information.

**Americans with Disabilities Act (ADA):** The College will make reasonable accommodations for persons with documented learning, physical, or psychiatric disabilities. Students should notify Dr. Christine Woodcock, the Counselor for Students with Disabilities. She is located at Green Woods Hall, in the Center for Student Development. Her phone number is 860-738-6318 and her email is [cwoodcock@nwcc.edu](mailto:cwoodcock@nwcc.edu).

**School Cancellations:** If snowy or icy driving conditions cause the postponement or cancellation of classes, announcements will be made on local radio and television stations and posted on the College’s website at [www.nwcc.edu](http://www.nwcc.edu). Students may also call the College directly at **(860) 738-6464** to hear a recorded message concerning any inclement weather closings. Students are urged to exercise their own judgment if road conditions in their localities are hazardous.

**Use of Electronic Devices:** Some course content as presented in Blackboard Learn is not fully supported on mobile devices at this time. While mobile devices provide convenient access to check in and read information about your courses, they should not be used to perform work such as taking tests, quizzes, completing assignments, or submitting substantive discussion posts.

**Sexual Assault and Intimate Partner Violence Resource Team:** NCCC is committed to creating a community that is safe and supportive of people of all gender and sexual identities. This pertains to the entire campus community, whether on ground or virtual, students, faculty, or staff. Sexual assault and intimate partner violence is an affront to our national conscience, and one we cannot ignore. It is our hope that no one within our campus community will become a victim of these crimes. However, if it occurs, NCCC has created the SART Team - Sexual Assault and Intimate Partner Violence Resource Team - to meet the victim’s needs.

SART is a campus and community based team that is fully trained to provide trauma-informed compassionate service and referrals for comprehensive care. The team works in partnership with The Susan B. Anthony Project to extend services 24 hours a day, 7 days a week throughout the year.

The NCCC team members are:

Ruth Gonzalez, Ph.D.	860-738-6315	Green Woods Hall Room 207
Susan Berg	860-738-6342	Green Woods Hall Room 223
Kathleen Chapman	860-738-6344	Green Woods Hall Room 110
Michael Emanuel	860-738-6389	Founders Hall Annex Room 308
Seth Kershner	860-738-6481	Library
Jane O’Grady	860-738-6393	Founders Hall Annex Room 212
Robin Orloski	860-738-6416	Business Office Room 201
Patricia Bouffard, Ex-Officio	860-738-6319	Founders Hall Room 103
Savannah Schmitt		Student Representative

At NCCC we care about our students, staff and faculty and their well-being. It is our intention to facilitate the resources needed to help achieve both physical and emotional health.