**Course:** General Chemistry I: CHEM-1030-001 (call #31289)

**Lecture:** 10:00-11:30 AM Tue.-Thur.; Room 6414

**Recitation:** 1 hour per week: Thur.; 12:00-1:00 Room 3066

**Laboratory:** 3 hours per week: Thur.; 1:00-4:00 Room 3066

### Course Requirements

**Text:**  
**General Chemistry – (Special 12 Edition)**  

**Laboratory Manual:**  
The lab experiments are on my web site  
[http://facultywp.ccri.edu/rkreiser/](http://facultywp.ccri.edu/rkreiser/)

The individual experiments can be downloaded as needed at CCRI or at home. You will need Adobe Acrobat Reader to open and print the lab experiments.

**Homework:**  
McGraw-Hill’s Connect – a web based homework. The access code was purchased with your text book or may be purchased separately online.

The internet location is  

**Laboratory:** Department Approved Safety Glasses  
Scientific Calculator

**Instructor:** Dr. Ralph Kreiser Room 3290

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**Introduction:** This course is the first semester of General Chemistry for science, pharmacy, or engineering students. The lectures cover such topics such as chemical bonding, chemical reactions, solids, liquids, and gases. This material covers chapters 1-12 of the text. Three exams (given during the lecture period) and a cumulative final are given. The lowest exam grade is dropped. Weekly quizzes (given by the lab instructor) covering current lecture material are given. The lowest quiz grade will be dropped. In the one hour recitation before the lab the quiz will be given, questions answered, and current experiment discussed.  

The lab experiments coordinate with the lecture material. There is a prelab assignment (prestudy), which must be done and handed in before the lab. Points are deducted if late. Lab reports involve filling in the report sheets in the lab manual and are due no later than a week after the lab is done. The lowest prestudy and lab report grades are dropped.  

**Connect,** an online homework set is required and is worth an exam grade. The assigned topics must be done by the due dates for full credit.  

No makeups are given for missed exams, quizzes or lab experiments. They will count as a drop.

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**Fall 2017**

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**SAVE THIS SYLLABUS FOR REFERENCE DURING THE SEMESTER.**
**General Information**

Office: Room 3290, Third floor  
Phone and Voice Mail: (401) 825-2261  
Office Hours: Tuesday and Thursday 9:30-10:00  
11:30-12:00  
Monday and Wednesday 8:00-8:30  
11:30-12:00

Chemistry Secretary: (401) 825-2252

EMAIL: rkreiser@ccri.edu

School Cancellations: (401) 825-2344

Chemistry Website: [http://ccri.edu/chemistry](http://ccri.edu/chemistry)

Laboratories cancelled due to snow etc will not be made up.

The due dates for laboratory prestudies and laboratory reports will be assigned by and handed in to the individual laboratory instructor.

Quizzes are given at the beginning of the recitation class by the individual laboratory instructor and are usually on the previous weeks lectures material.

Exams are given during the normal lecture period.

**No make-ups are given for missed quizzes, prestudies, exams, or labs. One quiz, prestudy, and lab are dropped. No quizzes are given the recitation period following an hour exam.**

**Grading Scheme**

The final grade is based on the following point distribution:

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Maximum Points (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Assigned Homework from Connect</td>
<td>100 Points</td>
</tr>
<tr>
<td>b. Best 9/10 Quizzes</td>
<td>90 Points</td>
</tr>
<tr>
<td>c. Best 2/3-Hour exams</td>
<td>200 Points</td>
</tr>
<tr>
<td>d. Best 12/13 Prestudies</td>
<td>120 Points</td>
</tr>
<tr>
<td>e. Best 12/13 Laboratory</td>
<td>240 Points</td>
</tr>
<tr>
<td>f. Comprehensive Final Exam</td>
<td>200 Points</td>
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<tr>
<td>Total Maximum Points</td>
<td>950 Points</td>
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</table>

**Percentage of Maximum Total Points**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A ; 93+</td>
<td>75-79</td>
</tr>
<tr>
<td>A- ; 90-92</td>
<td>70-76</td>
</tr>
<tr>
<td>B+ ; 87-89</td>
<td>65-69</td>
</tr>
<tr>
<td>B ; 83-86</td>
<td>60-66</td>
</tr>
</tbody>
</table>

**Fall 2017**
## Lecture Topics

### I. Matter and Measurement

- Physical and chemical changes and properties
- Measurement, metric system, SI units
- Significant figures and dimensional analysis
- Experimental basis of chemistry

Specific Heat (Chapter. 6: 6.5)

### II. Atoms and Elements

- Atomic theory and atomic structure
- Electrons, protons, neutrons, and isotopes
- Atomic Mass
- The Periodic Table of Elements
- Variation of chemical and physical properties
- Chemical formulas and nomenclature
- Writing and balancing chemical equations

### III. Stoichiometry

- The mole and Avogadro’s number
- Mole to mass conversions
- Percent composition of substances
- Empirical and molecular formulas
- Mass relationships in chemical reactions
- Limiting reagent problems
- Percent yield

**Exam No 1 Thursday, Oct. 19, 2017**

### IV. Chemical Reactions

- Molecular, ionic, and net-ionic reactions
- Precipitation reactions: Solubility rules
- Acid base reactions: Neutralization
- Molarity and dilution
- Gravimetric and volumetric analysis
- Titration and standardization

*Fall 2017*
V. Gases

Properties of gases
Boyle’s Charle’s Avogadro’s, Ideal Gas Laws
Dalton’s law of partial pressures
Density and gram molecular weights of gases
Molecular speeds and rates of effusion

VI. Thermochemistry

Kinetic and Potential energy
Units of energy
Enthalpy changes in chemical reactions
Hess’s Law
Enthalpy of formation

VII. Atomic Structure

Electromagnetic radiation
Bohr theory of the hydrogen atom
Electron transition calculations in hydrogen atom
Wave mechanical model of the atom
Quantum numbers
Shape of atomic orbitals
Spectroscopic notation and orbital diagrams
Electron configuration and quantum numbers

VIII. Periodic Table

Ionization energy and electron affinity
Relative sizes of atoms and ions

Exam No.2 Tuesday, Nov.21, 2017

IX. Chemical Bonding

Lewis dot structures
Bonding and nonbonding electrons
Single, double, and triple bonds
Octet rule
Resonance
Exceptions to octet rule

Fall 2017
## X. Molecular Geometry

<table>
<thead>
<tr>
<th>Text Topics</th>
<th>10.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSEPR theory</td>
<td>Prediction of molecular geometry thru</td>
</tr>
<tr>
<td>Lone electron pairs and molecular shapes</td>
<td>10.8</td>
</tr>
<tr>
<td>Polar bonds, dipole moments, and electronegativity</td>
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<tr>
<td>Hybrid orbitals</td>
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<tr>
<td>Sigma and pi bonds</td>
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</tbody>
</table>

## XI. Liquids and Solids

<table>
<thead>
<tr>
<th>Text Topics</th>
<th>11.1</th>
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</thead>
<tbody>
<tr>
<td>Intermolecular forces in liquids</td>
<td></td>
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<tr>
<td>Heating and cooling curves</td>
<td>thru</td>
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<tr>
<td>Fusion and vaporization</td>
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<tr>
<td>Vapor pressure of liquids and solids</td>
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<tr>
<td>Phase diagrams</td>
<td></td>
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<tr>
<td>Structure and properties of solids</td>
<td></td>
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</tbody>
</table>

## XII. Solutions

<table>
<thead>
<tr>
<th>Text Topics</th>
<th>12.1</th>
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</thead>
<tbody>
<tr>
<td>Solution concentration</td>
<td></td>
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<tr>
<td>Molarity, molality, mole fraction, % by mass</td>
<td>thru</td>
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<tr>
<td>Solubility of solids and gases</td>
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<tr>
<td>Colligative properties of solutions</td>
<td></td>
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<tr>
<td>Vapor pressure lowering</td>
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<tr>
<td>Boiling point elevation</td>
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<tr>
<td>Freezing point depression</td>
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**Exam No. 3 Thursday, Dec 14, 2017**

**Comprehensive Final Exam: Week of Dec 18-21**  
(Exact date and room location will be announced)

The final exam covers all twelve chapters and generally consists of double the multiple choice and essay question as a regular hour exam. Copies of old exams I, II, and III with answers are on reserve in the Learning Center. They may be xeroxed but not taken out of the library. No copies of the final exam are available.

Fall 2017
Upon successful completion of the course, the student will display

- Knowledge of basic chemistry concepts
- Quantitative problem solving
- Preparation for higher-level course work
- Maturation of student’s knowledge of chemistry
- Application of mathematical skills

Upon completion of the laboratory portion of the course, the student will display

- Development of competency in basic laboratory skills
- Knowledge of laboratory safety
- Skills in keeping a laboratory notebook
- Use of electronic balances and volumetric glassware
- Preparation of solutions
- Making observations, doing chemical measurements, and drawing conclusions
- Data analysis
- Report writing

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