1. **Catalog Description of the Course.** Include the course prefix, number, full title, and units. Provide a course narrative including prerequisites and corequisites. If any of the following apply, include in the description: Repeatability (May be repeated to a maximum of ___ units); time distribution (Lecture ___ hours, laboratory ___ hours); non-traditional grading system (Graded CR/NC, ABC/NC). Follow accepted catalog format.

**CHEM 122. GENERAL CHEMISTRY II (4)**  
Three hours of lecture and three hours of lab per week.  
Prerequisites: CHEM 121 with a grade of C or better  
An introductory chemistry course which provides an overview of the chemical and physical behavior of matter  
with a focus on quantitative general inorganic, physical, and analytical chemistry including kinetics and  
thermodynamics of reactions, gas phase and solution equilibria, and qualitative aspects of radiochemistry, organic  
chemistry, and polymer chemistry. Lab fee required  
*GenEd: B1*

2. **Mode of Instruction.**

<table>
<thead>
<tr>
<th>Units</th>
<th>Hours per Unit</th>
<th>Benchmark Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Seminar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Activity</td>
<td></td>
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</tbody>
</table>

3. **Justification and Learning Objectives for the Course.** (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements)  
[Use as much space as necessary]

This course is the first semester of a two-semester sequence that is generally an admission requirement for medical,  
veterinary, dental, or pharmacy schools. This course is a Category B1 general education course and is required for  
the B.S. degrees in Biology and in Environmental Science and Resource Management.

Students who successfully complete this course will be able to:  
- Describe chemical equilibrium both qualitatively and quantitatively  
- Explain solubility of material in aqueous solutions and be familiar with non-aqueous solutions  
- Solve problems dealing with acid-base chemistry  
- Describe oxidation-reduction chemistry qualitatively and in terms of equilibrium  
- Evaluate problems involving complex equilibrium (e.g. solubility in acidic solution)  
- Identify the most common crystal structures of chemicals  
- Describe the chemistry of common inorganic species  
- Identify different types of organic species  
- Explain the differences between basic categories of biologically important chemicals

4. **Is this a General Education Course**  
If Yes, indicate GE category: **B1**

<table>
<thead>
<tr>
<th>A (English Language, Communication, Critical Thinking)</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>B (Mathematics &amp; Sciences)</td>
<td>X</td>
</tr>
<tr>
<td>C (Fine Arts, Literature, Languages &amp; Cultures)</td>
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<tr>
<td>D (Social Perspectives)</td>
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<tr>
<td>E (Human Psychological and Physiological Perspectives)</td>
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</tbody>
</table>

5. **Course Content in Outline Form.**  
[Be as brief as possible, but use as much space as necessary]
Chemical Equilibrium
- Vapor pressure
- Melting and boiling
- Gas Phase Equilibrium
- Equilibrium and temperature
- Le Chatlier’s principle

Solutions
- Solvents and Solutes
- Water
- Solubility
- Solubility and equilibrium
- Solubility product
- Henry’s Law
- Freezing and melting of solutions
- Raoult’s Law
- Common Ion Effect
- Complex Ions

Acids and Bases
- Hydronium ions
- Equilibrium in water
- pH
- Strong acids and bases
- Weak acids and bases
- Equilibrium of weak acids and bases
- Acid-base titrations
- Buffers
- Polyprotic acids and bases

Oxidation and Reduction
- Oxidation-Reduction half reactions
- Balancing Redox reactions
- Redox reactions in acidic and basic solutions
- Electrical cells
- Standard state potentials
- Nernst Equation
- Equilibrium and Nernst
- Electrolysis

Inorganic Chemistry
- Crystals
- Description of crystal structure
- Common unit cells
- Non-crystalline solids
- Liquids
- Surface tension
- Phase diagrams
- Non-metallic elements and their compounds
- Main group metals
- Transition metals

Organic Chemistry
- Saturated hydrocarbons
- Unsaturated hydrocarbons
- Aromatic compounds
- Functional groups
- Alcohols and Esters
- Aldehydes and Ketones
- Organic acids
- Amines

Biochemistry
- Carbohydrates
- Lipids
- Amino acids and Proteins
6. **References.** [Provide 3 - 5 references on which this course is based and/or support it.]

Pauling, L. *General Chemistry*, 3rd Ed., Dover, 1970

7. **List Faculty Qualified to Teach This Course.**

Dr. Philip Hampton, Dr. Simone Aloisio

8. **Frequency.**

a. Projected semesters to be offered: Fall _____ Spring __X__ Summer _____

9. **New Resources Required.**

None.

10. **Consultation.**

Attach consultation sheet from all program areas, Library, and others (if necessary)

11. If this new course will alter any degree, credential, certificate, or minor in your program, attach a program modification.

____ Simone Aloisio ___________________ 1/8/03 __________________________
Proposer of Course Date